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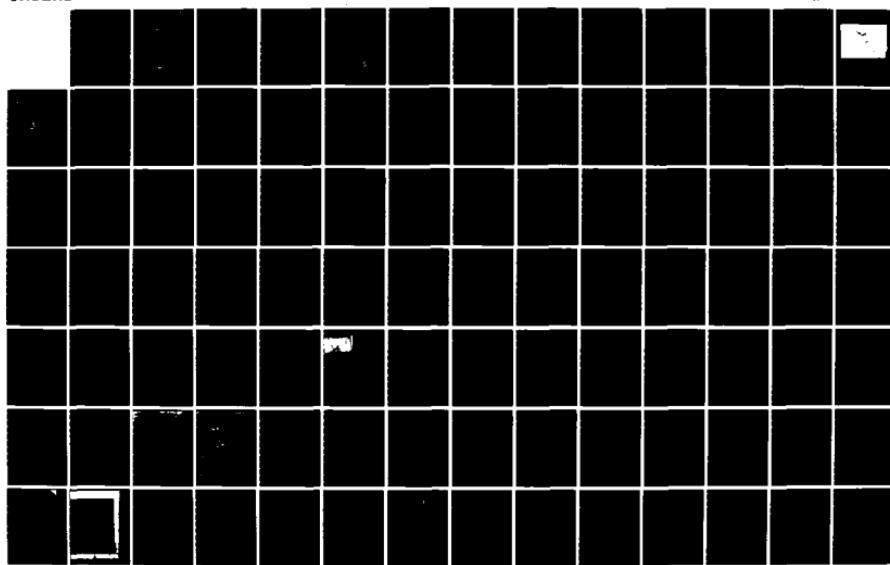
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WILLIAMS POND DAM (CT. (U) CORPS OF ENGINEERS WALTHAM
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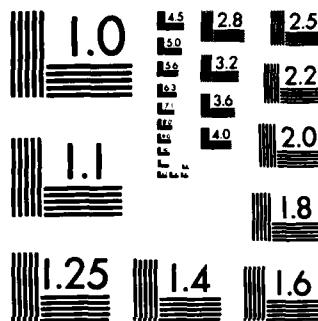
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THAMES RIVER BASIN
LEBANON, CONNECTICUT

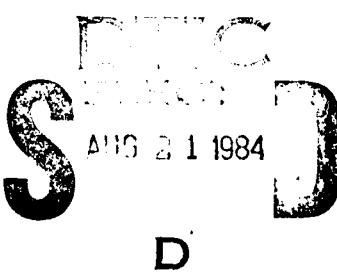


WILLIAMS POND DAM
CT 00551

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

OCTOBER 1978

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4. TITLE (and Subtitle) Williams Pond Dam	5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT	
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7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	8. CONTRACT OR GRANT NUMBER(s)	
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Thames River Basin Lebanon, Connecticut		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Williams Pond Dam is an earth dam with a stone masonry downstream face. The dam has a maximum height of 23.0 feet and is approximately 280.0 feet in length. The dam is considered to be in fair condition. Based on the size and hazard classification of the Corps of Engineers' guidelines, the test flood for this structure is in the range of the one-half PMF to full PMF.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

DEC 11 '07

Dear Governor Grasso:

I am forwarding to you a copy of the Williams Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Gilman Brothers, Inc., Gilman, Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

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WILLIAMS POND DAM

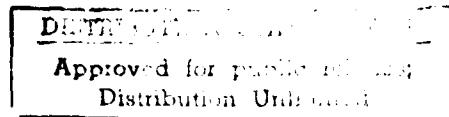
CT 00551



THAMES RIVER BASIN
LEBANON, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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NATIONAL DAM INSPECTION PROGRAM

PHASE 1 - INSPECTION REPORT

IDENTIFICATION NO.: CT 00551

NAME OF DAM: WILLIAMS POND DAM

TOWN: LEBANON

COUNTY AND STATE: NEW LONDON COUNTY, CONNECTICUT

STREAM: BARTLETT BROOK

DATE OF INSPECTION: 26 JUNE 1976

BRIEF ASSESSMENT

Williams Pond Dam is an earth dam with a stone masonry downstream face constructed about 1865. The dam has a maximum height of 23.0 feet and is approximately 280.0 feet in length. It has a left and right embankment of 60.0 feet and 180 feet, respectively, separated by an earth filled masonry spillway structure 39.0 feet wide. Located southwest of the main dam approximately 200.0 feet, an earth embankment dike 475.0 feet long protects Route 207.

Due to its age, Williams Pond Dam was neither designed nor constructed by present state of the art methods. Based upon the visual inspection at the site, the lack of engineering, operational or maintenance data, there are areas of concern which must be corrected to assure the long term performance of this dam. The dam is considered to be in fair condition. Signs of visible distress which indicate a po-

tential hazard are: seepage emerging along the downstream toe of the dam at both embankments and the spillway, leakage through the downstream masonry face of the spillway structure; erosion and wear on the upstream face of the dam and dike, and accumulation of debris and vegetation in the downstream channel.

Based on the size and hazard classification of the Corps of Engineers' guidelines, the test flood for this structure is in the range of the one-half PMF to full PMF. The one-half Probable Maximum Flood was adopted as the Test Flood for Williams Pond Dam. Calculations indicate that test flood outflow of 1726 cfs (553 csm) would overtop the dam by about 2.3 feet; therefore, the spillway capacity is considered inadequate. Assuming the pool level at top of the dam, the spillway can pass a flow of 283 cfs, which represents 16 percent of the test flood outflow. Due to the potential for overtopping, it is recommended that a definite plan of surveillance and a warning system be developed during periods of unusually heavy rains.

It is recommended that the Owner engage the services of an engineer experienced in the design of dams to accomplish the following: evaluate and design a seepage monitoring system to effectively collect and record these flows in order to note changes that may occur, examine in detail the seepage through the face of the spillway to determine its effect on the structural stability of the dam, analyze the embankments with regard to the test flood for slope protection and freeboard allowances, institute corrective measures to reduce the overtopping potential and improve

the spillway capacity, and to conduct further study of the hydraulic and hydrologic aspects of the drainage basin to provide alternate means of reducing the overtopping potential at the dam by considering improvements such as: development of upstream storages, construction of an emergency spillway and others.

The above recommendations and remedial measures as described in Section 7 should be implemented by the Owner within one year after receipt of this Phase 1 Inspection Report. Alternatives to these recommendations would include reducing the Williams Pond water levels during expected periods of intense storm activity to provide flood storage capacity.

C-E MAGUIRE, INC.

By Richard W. Long
Richard W. Long, P.E.
Vice-President



This Phase I Inspection Report on Williams Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

Fred J. Ravens Jr.

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

Saul Cooper

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

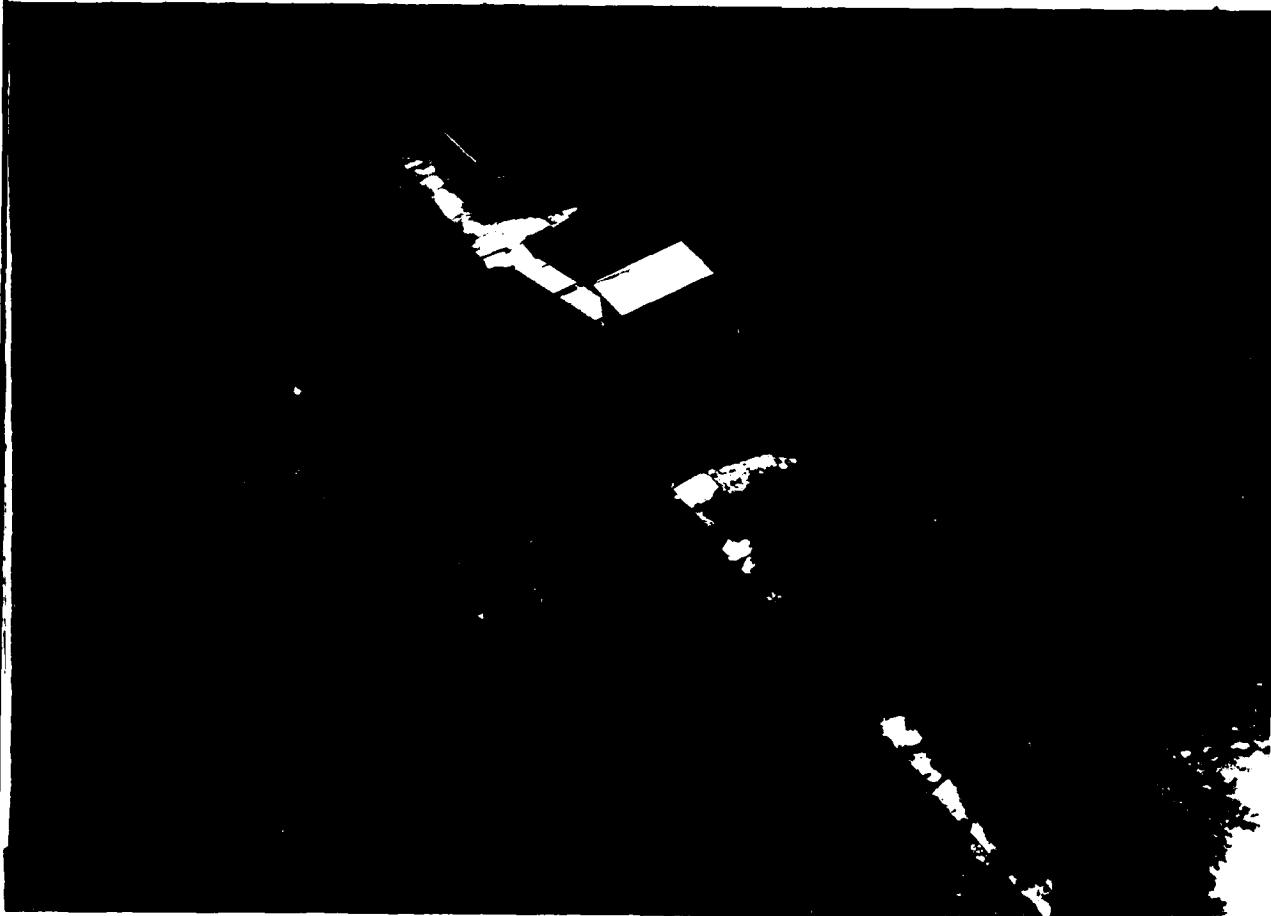
Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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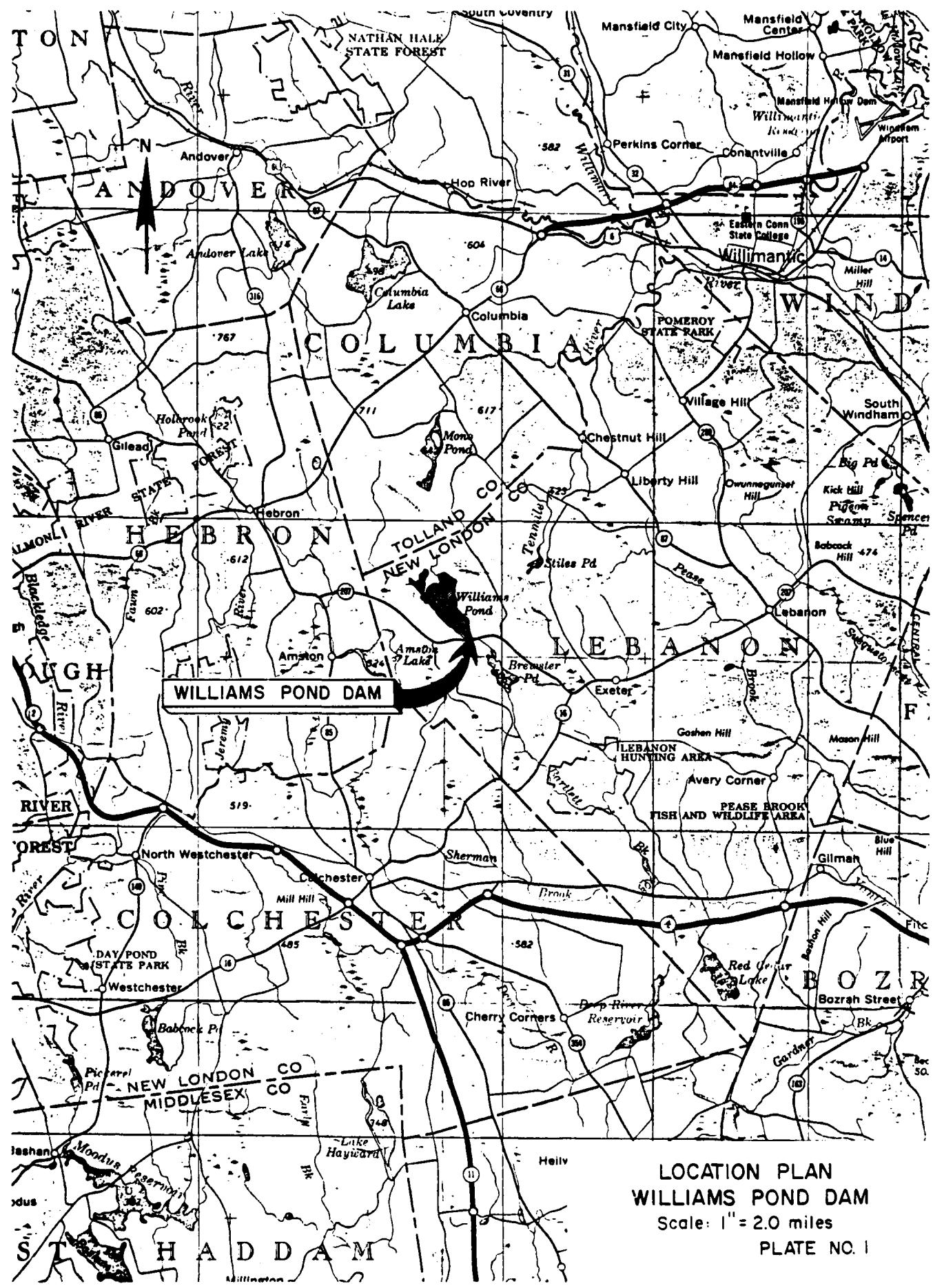
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C-1 WILLIAMS POND DAM - LOOKING UPSTREAM



LOCATION PLAN
WILLIAMS POND DAM
Scale: 1" = 2.0 miles
PLATE NO. 1

PHASE 1 INSPECTION REPORT

WILLIAMS POND DAM CT 00551

SECTION 1

PROJECT INFORMATION

1.1 GENERAL

- a. Authority: Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. C-E Maguire, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to C-E Maguire, Inc. under a letter of 26 April, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0300 has been assigned by the Corps of Engineers for this work.

b. Purpose:

1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT

- a. Location: Williams Pond Dam is located adjacent to Route 207 in the Town of Lebanon, New London County, Connecticut, approximately 2.0 miles northwest of the intersection of Routes 207 and 16. The dam is located on the headwaters of Bartlett Brook and impounds water from a rural watershed area of 3.12 square miles. Williams Pond is about 263 acres in size with the dam located at the southeastern limit of the pond. See the location map (Plate No. 1) and drainage basin map (Appendix D).
- b. Description of Dam and Appurtenances: The dam is an earth embankment approximately 280.0 ft. in length including the spillway. The dam has a maximum height of 25.0+ feet adjacent to the spillway. The embankment crest varies in width from 10.0 to 17.0 feet. The upstream slope is unknown (See Sketch in Appendix B-3) and the downstream face is a dry stone masonry wall battered about 1H:3V. The spillway is stone masonry construction 39.0 feet in length and approximately 25 feet high, with a straight approach channel and a broad crested weir section. Training walls extend into Williams

Pond and are constructed of stone masonry. The outlet works consists of a 30 inch diameter steel pipe with control mechanism located in a gatehouse structure at the center of the spillway. The outlet discharges into a natural stream bed that flows downstream beneath Route 207.

Southwest of the dam an earth dike approximately 475.0 ft. in length with an average crest width of 7.0 ft. and height of 3.0 to 4.0 feet is located parallel and adjacent to Route 207. (See Sketch in Appendix B-3).

- g. Purpose of the Dam: General recreation; supplemental process water supply and power generation for a downstream manufacturing facility.
 - h. Design and Construction History: There are no records available regarding the early history of this structure. The dam was constructed about 1865 by the Kent Manufacturing Company and any design, construction or subsequent repair information is not available. In 1905 the Gilman Manufacturing Company of Gilman, Connecticut, the present owners, purchased the facility and have been responsible for subsequent repairs. Correspondence records indicate that about 1948 a new gatehouse and control gate were constructed. In October, 1963, the Gunite Restoration Company of Malden, Massachusetts performed repairs on the dam. The work involved pumping a cement and sand grout mixture into the structure and covering the rubble-stone face of the dam with a grout surfacing. Drawings or specifications of this work are not available.
 - i. Normal Operational Procedures: As a general rule the outlet is opened about October and the water level in Williams Pond lowered 2 to 3 ft. and maintained at that level until spring when normal runoff returns the level to "full pond" at spillway crest elevation. This schedule is reportedly flexible and contingent on the availability of process water and supply for power generation as a result of weather conditions. The

Owner reports that inspections of the dam occur on a frequent basis; however, there are no logs available of this activity.

1.3 PERTINENT DATA

- a. Drainage Area: Williams Pond is located on the headwaters of Bartlett Brook in the Town of Lebanon, Connecticut. The drainage basin is generally oblong in shape with its longest axis in a north-south orientation. The basin is approximately 3.0 miles in length with an average width of 1.0 mile and drains an area of 3.12 square miles. The basin terrain consists of generally rolling hills with hilltops at El. 600.0+ and some sluggish and swampy tributaries. The basin slopes are moderate. Some flat swampy areas within the basin tend to reduce and modify the peaks of surface runoff that occur at the dam. A general basin map is included in Appendix D of this report.
- b. Discharge at Damsite: There are no discharge records available for this dam. Listed below are other discharge data:
 1. Outlet works size 30 inch diameter with downstream invert El. 427.75
 2. Maximum known flood at damsite unknown
 3. Overflow spillway capacity at maximum pool elevation (top of dam) equals 283.0 cfs at El. 446.80
 4. Gated outlet capacity at normal pool elevation (spillway crest) equals 105.0 cfs at El. 445.0

5. Gated outlet capacity at maximum pool elevation (top of dam) equals 110 cfs at El. 446.80
6. Total discharge capacity at maximum pool elevation (top of dam) equals 393 cfs at El. 446.80
7. Total discharge at test flood elevation equals 1850 CFS at El. 449.11.

c. Elevation (ft. above NGVD)

1. Top Dam 446.80
2. Test flood pool elevation 449.11
3. Full flood control pool Not applicable
4. Recreation pool 445.0
5. Spillway crest 445.0
6. Outlet invert 427.75
7. Streambed at centerline of dam 419.6 D/S-425.0 U/S
8. Maximum recorded tailwater Unknown

d. Reservoir (Feet)

1. Length of maximum pool 15,000
2. Length of recreation pool 15,000
3. Length of flood control pool Not applicable

e. Storage (acre-feet)Total

1. Recreation pool (spillway crest) 3,520 at El. 445.0
2. Flood control pool Not applicable
3. Test flood elevation 4600 at El 449.11

- 4. Top of dam 3,993 at El 446.8
- 5. Net storage between top of dam and spillway crest is 473 Ac-ft which represents 2.84 inches of runoff from the drainage area of 3.12 square miles.
- 6. One foot of surcharge = 1.58 in. of runoff.

f. Reservoir Surface (acres)

- 1. Top dam 263 = 13.17% of total drainage area
- 2. Maximum pool 263
- 3. Flood-control pool ---
- 4. Recreation pool 263
- 5. Spillway crest 263

g. Dam

- 1. Type - Apparently homogenous earth dam w/downstream dry stone facing
- 2. Length 280 feet
- 3. Height D/S=25.4 feet
U/S=20.0 feet (estimated)
- 4. Top Width 10-17 feet
- 5. Side Slopes Upstream unknown
Downstream battered
at 1H:3V
- 6. Zoning UNKNOWN
- 7. Impervious Core UNKNOWN

8.	Cutoff	UNKNOWN
9.	Grout curtain	UNKNOWN
10.	Other	---
h.	<u>Spillway</u>	
1.	Type	Overflow-Broad Crested Uncontrolled
2.	Length of weir	39.0
3.	Crest elevation	445.0
4.	Gates	None
5.	U/S Channel	Natural
6.	D/S Channel	Natural
7.	General	---
i.	<u>Regulating Outlets</u>	- Refer to Paragraph 1.2b "Description of Dam and Appurtenances" page 3 for description of Outlet Works.
1.	Invert	426.50
2.	Size	30"Ø pipe
3.	Description	Steel pipe
4.	Control Mechanism	Hand operated hoist mechanism
5.	Other	----

SECTION 2

ENGINEERING DATA

2.1 Design

There are no documents concerning the design, construction or repairs of this dam. In an inspection report dated September 16, 1965, as-built sketches are included which show the drainage area, the cross section of the spillway, a plan view and an elevation of the dam. Some additional descriptive data about the dam is given in the inspection report.

2.2 Construction

There is no construction data available for this dam.

2.3 Evaluation

a. Availability

There are no plans, specifications or computations available from the Owner or State Offices regarding the design, construction, or repairs to this dam.

b. Adequacy

The lack of in depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgment.

c. Validity

Validity of limited data must be verified.

SECTION 3

VISUAL INSPECTION

3.1 FINDINGS

a. General: The overall condition of Williams Pond Dam is fair, Leakage is apparent through the downstream face of the spillway and at the spillway abutments. Seepage at the toe of the downstream masonry face of the dam occurs in several locations. Vegetal growth and trees obscure the downstream toe of the dam, and vines and low brush cover the spillway abutments and embankments. The earth dike parallel and adjacent to Route 207 has visible signs of wear and erosion and in several locations has been reduced in cross-section by trespass or overuse. There is an apparent lack of proper maintenance for this dam and its appurtenances.

b. Dam

Seepage is occurring through and under the embankments on the left and right sides of the spillway, at the spillway-bedrock interface, and possibly through the left and right abutments or foundation soils. At the time of visual inspection, the seepage water was clear. The evidence for the seepage is the presence of mushy zones 10 to 20 ft. downstream from the dam just to the left and right of the spillway, as may be seen in Photograph C-6, 7, 12 and as shown in Appendix B-3.

Shrubbery and low trees grow profusely on the dike and on the embankment to the left of the spillway structure (Photos C-3, 10). Trees up to 10 inches in diameter grow just downstream of the dam on both abutments and adjacent to the spillway discharge channel. Stumps of large trees exist on the left embankment. (See photo C-8).

The downstream face of the dam on the left side of the spillway consists of dry wall construction of cut stone. At the base of the downstream corner of this wall, nearest to the spillway, close inspection of the stones indicates the possibility that movement has or is taking place. The stones may have moved relative to each other about 1 to 2 inches. The direction of the apparent movement of these corner stones relative to the remainder of the wall is downward and toward the spillway section. Photo C-10 shows a view of this corner of the wall but movements cannot be distinguished in the photo.

No filter material could be observed to exist between the downstream stone face and the soil in the embankment.

- b. Appurtenant Structures: Substantial erosion has occurred in several locations on the 475 ft. dike. See Photo C-11 for one example of this erosion. The upstream face of this dike has been protected with a dry-rubble stone wall about 3 ft. high. In many locations this wall has collapsed into the

pond, exposing the dike soil directly to wave action. There is no filter material present between the rubble stone and the dike soil. Wave action, erosion and trespassing have combined to cause several zones at which a considerable portion of the crest of the dike has been eroded. In one location the erosion has proceeded to such an extent that the crest width is practically zero over a length of about 10 feet.

The downstream face of the spillway structure appears to have seepage on several locations and at varying heights emerging through the grout facing. Leakage is also occurring beneath the spillway capstone. (See Photo C-4).

The access bridge to the gatehouse should be closely monitored during high flows to prevent floating debris from accumulating along its length. This accumulation has the potential to increase flooding or to damage the bridge and result in loss of gate control. See Photo C-2.

- c. Reservoir Area: Generally the pond perimeter appears to be heavily wooded with moderate to flat terrain. The heavy growth should preclude the occurrence of slides or sloughs and subsequent sedimentation. However, this heavy growth near the approach to the dam should be monitored under a regular program to insure that it does not become floating debris that could clog or endanger the spillway or gatehouse.

d. Downstream Channel: The downstream channel is naturally meandering and confined, but is now additionally restricted with debris and vegetal growth. This growth should be removed to prevent clogging of the downstream bridge structure at Route 207 (See Photo C-9). There is little development between Williams Pond and Brewster Pond indicated on the USGS Topographic Map. Colchester Road crosses the channel between these two ponds.

3.2 EVALUATION

This dam contains several features which may lead to future difficulties.

First, the damp and mushy zones on both abutments downstream from the dam indicate that preferred seepage paths may have developed from the pond through the abutments. There was no evidence that soil fines were being carried to these zones, hence there is no need for emergency action. However, these seeps should be evaluated to determine whether they may become dangerous.

Second, the erosion that has taken place on the upstream side of the dike will continue during periods of high water and high wind, since the riprap is damaged. The subsequent erosion may proceed at a more rapid rate than in the past in those locations where the crest width has been reduced to nearly zero.

The seepage that is occurring at the base of the two dam embankments and the spillway section currently does not appear to be carrying

soil fines. However, there is no information available about the composition of the soil in the embankment needed to evaluate the potential for internal erosion. Based on the fact that the dam has existed for decades without failure, one may conclude that there is no immediate threat of failure. However, at the location where the seepage was greatest, and clearly audible, on the left side of the spillway, the base of the downstream face appears to have been displaced a distance of inches. These two observations may be related, indicating a long term trend for internal erosion and subsequent shifting of the stones in the face. Alternatively, frost action may be causing the apparent relative movements. An evaluation of the condition of this embankment is therefore necessary.

Substantial growth of trees and shrubs on the dam, the dike, and the abutments downstream of the dam, all indicate that this dam is receiving limited or no maintenance. The vegetation at present does not seem to pose a hazard to the dam, although it does prevent one from making a thorough inspection of the slopes and the abutments. Removal of this vegetation on a regular basis is vital to the long-term condition of the dam.

SECTION 4

OPERATIONAL PROCEDURES

4.1 PROCEDURES

Williams Pond Dam water surface levels are generally not regulated. The storage is maintained for recreation and as a supplemental supply for use downstream as process water and power generation. As a rule, the water level is lowered in October approximately 2 to 3 feet and maintained at that level until spring runoff when "full pond" (at spillway crest) is re-established. This schedule is reportedly dependent on the weather conditions and the downstream demand. The dam is visited by the Owner at irregular intervals depending on his perception of the need.

4.2 MAINTENANCE OF DAM

The dam is not properly and regularly maintained. Its condition warrants an active program of rehabilitation to ensure its continued service.

4.3 MAINTENANCE OF OPERATING FACILITIES

The outlet works gate was not operated during this field inspection. However, it was reported by the Owners at the time of the inspection that the gate was operable and in good condition. Clearing of debris and vegetation from the downstream channel is essential to prevent clogging and unnecessary localized flooding.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

No formal emergency plan is in effect to reduce or minimize downstream damage in emergency situations for Williams Pond Dam. Personnel at the Bozrah Light and Power Company, where the downstream power is generated, monitor broadcasts used by Power Service Companies to forecast approaching storm events; however, no record of any emergency action taken in past years was available.

4.5 EVALUATION

Regular operational or maintenance procedures for this dam have not been developed or followed. In view of the neglected condition of this structure and its appurtenances, it is important that the Owner immediately institute a program of monitoring, inspection and maintenance.

SECTION 5
HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data: No design data is available for this dam or its watershed. In lieu of existing design information, data such as: drainage area, water surface area, runoff and watershed characteristics; was developed from U.S.G.S. topographic mapping of the area. Inflow and outflow discharges were developed using Corps of Engineer criteria to establish spillway capacity and are listed in Appendix D. Limited data used or developed in the analysis was obtained or verified by actual field measurements at the time of the visual inspection. Surcharge storage was approximated assuming a constant pond surface area above the spillway crest elevation. The dam failure discharge was determined and the downstream water levels approximated only, due to the lack of definitive topographic and storage data regarding Brewster Pond (See Appendix D).

- b. Experience Data: No record of historical data relating to discharges or water levels or reported overtopping has been maintained at this dam.
- c. Visual Observations: Based on visual observations made during the field inspection, the following detrimental items require attention:
 1. The freeboard for this dam is only 1.8 feet. Calculations indicate that a stillwater level for a 10 year frequency event will reach the top of the dam. Waves and storm surge associated with this event will overtop the dam.
 2. A regular program of maintenance is required to clear and maintain an unobstructed downstream channel. The limits for clearing of the channel should extend downstream of the Route 207 highway bridge structure.
 3. The access bridge to the outlet works gate should be monitored and kept in serviceable condition. It should be noted that the bridge will act as a debris collector and should be monitored particularly during high flow periods to ensure that floating debris will not overload it or that it will not be damaged, causing loss of control of the gate.
 4. Calibration of the gate control with the impoundment should be done and records maintained of water surface

levels to assist in the timely regulation of the water level.

- d. Overtopping Potential: Using the screening criteria established by the Corps of Engineers, the test flood adopted for Williams Pond Dam is equal to one half the Probable Maximum Flood (PMF). Calculations indicate that water levels for this flow will overtop the crest of the dam by approximately 2.31 ft. It is apparent that the spillway capacity is inadequate and the dam will be overtopped by such flows. As indicated in Section 5.1a, even a 10 year storm event will produce water surface levels that approach the crest elevation of 446.80, without any consideration for wave surge, ride-up or splash. The maximum spillway discharge capacity of 282.0 cfs represents 16.3% of the "Test Flood" outflow discharge of 1726.0 cfs (Refer to table on page 20).

It is estimated that with a full pond (water level at spillway crest), the outlet works (105.0 cfs capacity) will require 30.0 hours to drawdown the reservoir the first foot of depth.

The failure discharge for Williams Pond Dam of 5830 C.F.S. (See Appendix D) will generate an approximate water surface level of Elevation 438 immediately downstream of the dam. This will raise the water surface approximately 9 feet above the Route 207 roadway and 4 ft. above the Brewster Pond level existing just prior to failure when the discharge is 283 C.F.S.

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	530	247	1.65	446.65
50	6.5	4.1	850	387	2.20	447.20
100	7.0	4.6	942	451	2.35	447.35
1/2 PMF	11.9	9.5	3120	1726	4.11	449.11
=						
TEST FLOOD						

*Infiltration assumed as 0.1"/hour

**Lake assumed initially full at spillway crest elevation 445.0
(Top of dam = 446.80)

NOTES:

1. Q_{10} ; Q_{50} ; Q_{100} ; inflow discharges computed by approximate methodology of Soil Conservation Service.
2. 1/2 PMF and "test flood" computation based on COE instructions and guidelines.
3. Maximum capacity of spillway without overtopping the top of the dam elevation 446.80 is equal to 283 C.F.S.
4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
5. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.

SECTION 6

STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Based on visual observations, there is a potential for long-term instability due to erosion. First, seepage exiting from the abutments downstream of the dam may now or in the future be carrying soil fines to cause erosion, although no evidence of current loss of fines was observed. Second, seepage through the embankments around the spillway section may be carrying fines from the embankment through the openings between the large stone blocks that form the downstream face. Third, the dike is being eroded by wave action and eventually will be breached if repairs are not made.

There was no visual indication that the dam is unstable with respect to sliding, downstream slope failure, cracking, or overturning of the spillway section.

b. Design and Construction Data

There is no design and construction data on which to base an evaluation of stability of this dam.

c. Operating Records

There are no operating records from which one could judge the stability of this dam.

d. Post-construction Changes

Subsequent to construction, the following changes apparently have occurred:

1. Flashboards originally were used to maintain a higher pond level than exists at present, but are no longer utilized.
2. The upper 8.0 feet of stone work on the upstream side of the spillway has been pointed, the voids between the stonework were grouted, and the downstream face was gunited. This work was carried out, it is believed, to reduce leakage through the stonework. Subsequently, the gunite facing has partially flaked off. These changes would reduce the leakage and improve the stability somewhat. However, the gunite on the downstream face would tend to defeat the purpose of the grouting by providing an impervious downstream face, thus increasing the average pressure within the dam.
3. Shrubs and trees have been allowed to grow on the dike, dam embankment, and the abutments just downstream of the dam. This growth can lead to internal erosion of the dam.

e. Seismic Stability

The dam is located in Seismic Zone No. 1 and in accordance with recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition: Based on the visual inspection, correspondence, records available and reported past operational performance, the dam is judged to be in fair condition. The following areas of concern must be corrected in order that this structure remain functional over a long term.

1. This dam will not pass the test flood without overtopping the structure by 2.31 feet, and therefore, the present spillway capacity is considered inadequate. The spillway capacity is judged seriously inadequate, as the dam will be overtopped by wave action from storm events as frequent as 10 years.
2. Seepage that emerges along the downstream face at the abutments, spillway and embankments was flowing clear at the time of the inspection. However, this seepage must be monitored and controlled.
3. Serious erosion has occurred on the dike surfaces reducing its cross-section at several locations. At one location the width is reduced to 1 to 2 feet.
4. Riprap slope protection for the upstream face of the embankment and dike is dislodged and ineffective. New slope protection must be provided.

5. Stumps, trees and vegetation that have overgrown the dam and its appurtenances must be removed and the site maintained.
- b. Adequacy of Information: The information available is such that the assessment of the condition of the dam was based primarily on the visual inspection.
- c. Urgency: The recommendations and remedial measures described below should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.
- d. Necessity for Additional Investigations: Additional investigations to further assess the adequacy of the dam and its appurtenances are necessary. These additional investigations are described in Section 7.2.

7.2 RECOMMENDATIONS

Engage the services of an engineer who is experienced in the design of earth dams to accomplish the following:

- a. Analyze the freeboard requirements with respect to the Test Flood criteria and institute corrective measures to reduce the overtopping potential and improve the spillway capacity and efficiency.
- b. Investigate whether the seepage that is occurring through the embankment and the abutments is now or may in the future carry fines and cause internal erosion or other detrimental effects on the stability of the dam. As part of this investigation,

the apparent small movements of the downstream face near the left side of the spillway section should be studied to determine their probable cause. If deficiencies are found, recommendations should be given to repair the wall and prevent deterioration.

- c. Design new riprap protection for the upstream face of the dike and restore the full cross section of the dike.
- d. Provide recommendations for removal of stumps and roots that presently exist on the embankments and for replacing the roots with properly selected and compacted soils.

7.3 REMEDIAL MEASURES

- a. Alternatives: As an alternate to the immediate commencement of investigations to upgrade the structure, Williams Pond water surface levels should be lowered and maintained at a level below the spillway crest to provide flood storage for storm events. Net storage between spillway crest elevation and top of dam is 2.8 inches of runoff. Refer to the table on Page 20 for additional details.
- b. Operating and Maintenance Procedures:
 1. Develop and commence a regular inspection and maintenance schedule for the facility including the removal of vegetal growth.
 2. Incorporate in the above program monitoring of the seepage and examination of the tree stumps on the slopes.

Once a procedure has been developed for the removal of the rotting stumps and roots, incorporate this procedure into the regular maintenance program.

3. Develop a system for the recording of data with regard to items such as: water levels, discharges, time and draw-down to assist those responsible for the monitoring of the structure.
4. Prepare an "Emergency Action Plan" to prevent or minimize the impact of failure, listing the expedient action to be taken and authorities to be contacted.
5. Because of the concerns for this dam and the limited data available, a round the clock surveillance should be instituted during periods of high precipitation.
6. Restrict overuse and trespass on the dam and its appurtenances.
7. Clear debris and large overhanging trees from the discharge channel.
8. Insure operation of the sluice gate.
9. Repair or replace the misshapen and corroded outlet conduit. Consider for a future construction program relocating the gatehouse away from the spillway to a more accessible position.
10. Replace and repoint mortar grouting on weir and training walls.

11. Monitor left training wall for settlement and movement.
12. Continue the technical periodic inspections of this facility on a bi-annual frequency.

APPENDIX A

VISUAL INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST

PROJECT Williams Pond Dam

DATE 26 June 1978

TIME 9:30 AM

WEATHER

W.S.ELEV. _____ U.S. _____ D.S. _____

PARTY:

- | | |
|----------------------------|-------------------------------------|
| 1. <u>R. Long - CEM</u> | 6. <u>D. Sluter - CEM</u> |
| 2. <u>A. Reed - CEM</u> | 7. <u>R. Valles - CEM</u> |
| 3. <u>S. Khanna - CEM</u> | 8. <u>S. Poulos - GEI</u> |
| 4. <u>R. Brown - CEM</u> | 9. <u>The Gilman Brothers-Owner</u> |
| 5. <u>J. Maynard - CEM</u> | 10. _____ |

PROJECT FEATURE

INSPECTED BY

REMARKS

1. Note: A second inspection was made on 29 September 1978.
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	447 NGVD
Current Pool Elevation	444
Maximum Impoundment to Date	
Surface Cracks	None Observed
Pavement Condition	Grassed, shrubbery, and footpath
Movement or Settlement of Crest	None observed. Irregularities too great to discern deformations
Lateral Movement	Too irregular to be discerned
Vertical Alignment	Too irregular to be discerned
Horizontal Alignment	Too irregular to be discerned
Condition at Abutment and at Concrete Structures	Seepage from toe along bedrock interface on both sides. Also, seepage and mushy zones 10 to 22' ds of left abut. and 15 to 20' ds of right abutment.
Indications of Movement of Structural Items on Slopes	There are no structural items on slopes
Trespassing on Slopes	Free access. Several locations on rt. embankment are eroded by trespass.
Sloughing or Erosion of Slopes or Abutments	Left embankment is eroded to beach slope (Sta 1+60) on ups. side.
Rock Slope Protection - Riprap Failures	Riprap does not exist to right or left of spillway - eroded to beach slope.
Unusual Movement or Cracking at or near Toes	None Observed
Unusual Embankment or Downstream Seepage	None observed ds of left or right dikes except from abutment contact of spillway structure noted above

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u> (cont.)	
Piping or Boils	None observed
Foundation Drainage Features	Many polyethylene (grout?) pipes sticking out of ds face. No water coming from them
Toe Drains	None
Instrumentation System	None
Vegetation	Trees and shrubs on left and right embankments

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u>	
Crest Elevation	446 to 447 NGVD
Current Pool Elevation	444
Maximum Impoundment to Date	
Surface Cracks	None observed
Pavement Condition	Pathway on Dike.
Movement or Settlement of Crest	None observed, but irregularities too great to discern
Lateral Movement	
Vertical Alignment	Irregularities too great to discern lateral movements or any misalignments
Horizontal Alignment	
Conditions at Abutment and at Concrete Structures	Good. No concrete structures present
Indications of Movement of Structural Items on Slopes	No structures present
Trespassing on Slopes	Free access. Path along center of dike is worn down to soil.
Sloughing or Erosion of Slopes or Abutments	Eroded in several locations from wave action and/or trespass. In three locations erosion extends to downstream crestline. At 3+40 there is a 20 ft. long eroded zone.
Rock Slope Protection - Riprap Failures	Riprap is a poorly maintained, unfiltered vertical stone rubble wall about 3' high which has collapsed in several locations.
Unusual Movement or Cracking at or near Toes	None observed.

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT (cont.)</u>	
Unusual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	None observed
Toe Drains	None
Instrumentation Systems	None
Vegetation	Profuse Shrubbery

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel Slope Conditions Bottom Conditions Rock Slides or Falls Log Boom Debris Condition of Concrete Lining Drains or Weep Holes	{ See Spillway Section of checklist

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam DATE 26 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - GATE HOUSE</u>	
a. Concrete and Structural	
General Condition	Good
Condition of Joints	Good
Spalling	None observed
Visible Reinforcing	None observed
Rusting or Staining of Concrete	Staining noted
Any Seepage or Efflorescence	Cannot observe
Joint Alignment	Satisfactory
Unusual Seepage or Leaks in Gate Chamber	Cannot observe
Cracks	None observed
Rusting or Corrosion of Steel	None observed
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	Manually operated sluice gate within locked gate house. Not operated at the time of inspection.
Service Gates	
Emergency Gates	
Lightning Protection System	

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam DATE 26 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - GATE HOUSE (cont.)</u> Emergency Power System Wiring and Lighting System	Manually operated sluice gate within locked gate house. Not operated at the time of inspection.

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam DATE 26 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	No transition.
Erosion or Cavitation	Conduit consists of 30 inch diameter steel plate pipe (riveted). Outlet is badly misshapen and corroded.
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam DATE 26 June 1978
INSPECTOR _____ DISCIPLINE _____
INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel	No outlet structure as such. Outlet channel is the same as the discharge channel for the spillway.

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam DATE 26 June 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Straight
General Condition	Not observable
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Natural bed
b. Weir	
General Condition of Concrete	Rubble masonry construction, sharp crest - overflow type; crest consists of concrete sill. Rubble masonry on downstream face of weir has been coated with mortar and possibly grouted. General condition of cement mortar coating is poor to fair.
Rust or Staining	Staining noted
Spalling	Mortar coating spalled off in several places. Grout pointing loose.
Any Visible Reinforcing	None
Any Seepage or Efflorescence	Yes, considerable seepage noted
Drain Holes	None observed
b' Training Walls	
General Condition	Stone masonry walls
Rust or staining	Fair - grout washed out
Spalling	None observed
Visible Reinforcing	NA
Seepage or Efflorescence	NA
	Yes

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond Dam

DATE

26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS - (cont.)</u>	
b' (cont.)	
Drain Holes	None
	Lower third of left training wall appears to have settled and moved into the downstream channel
c. Discharge Channel	
General Condition	Poor, littered with debris, brush, trash and trees
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Many - up to 10 inch diameter
Floor of Channel	Natural bed - meandering poor condition
Other Obstructions	Junk and debris as well as highway bridge

PERIODIC INSPECTION CHECK LIST

PROJECT Williams Pond DamDATE 26 June 1978

INSPECTOR _____

DISCIPLINE _____

INSPECTOR _____

DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	
a. Super Structure	Timber deck on steel stringers. Timber treads rotted and cracked.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	Steel and wood
Under Side of Deck	
Secondary Bracing	NA
Deck	Poor - some planks missing
Drainage System	NA
Railings	None
Expansion Joints	NA
Paint	None
b. Abutment & Piers	No piers present. Abutment consists of right training wall.
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

1. Listing of locations for Available Correspondence Data.
2. Copies of Past Inspection Reports and Chronology of Correspondence
3. Plans, Sections, Details

APPENDIX B-1

1. Victor J. Galgowski, Dam Safety Engineer
Department of Environmental Protection
State Office Building
165 Capitol Street
Hartford, Connecticut
2. Gilman Brothers, Inc.
Gilman, Connecticut 06336
Attention: Mr. Lawrence Gilman
(203)-889-8444

APPENDIX B-2

Copies of past inspection reports:

1. 17 April 1963 State of CT., inventory sheet.
2. 14 May 1974 Letter from Jose H. Cosio, P.E. of Macchi & Hoffman, Engineers, Hartford, CT. to V. Galgowski, State of CT., DEP.
3. 16 June 1972 Letter from Jose H. Cosio of Macchi & Hoffman to William H. O'Brien, State of Ct., DEP.
4. 27 May 1971 Letter from A. J. Macchi of Macchi & Hoffman to William H. O'Brien, State of Ct., Water Resources Commission.
5. 11 March 1969 Letter from B. H. Palmer of Chandler and Palmer, Norwich, Ct., to Charles Gilman of the Gilman Brothers Co., (Owner), Gilman, CT.
6. 29 March 1968 Letter from A. J. Macchi of Macchi & Hoffman to William H. O'Brien, State of CT., Water Resources Commission.
7. 4 August 1966 Memo. to file from W. H. O'Brien, State of CT., Water Resources Commission.
8. 16 September 1965 Transmittal letter and report from J. J. Schmid, P.E., State of CT., Water Resources Commission.
9. 9 September 1965 Memo. from William P. Sander, Engr. & Geologist, State of CT., Water Resources to John J. Curry, Chief Engineer Water Resources Commission.
10. 1 June 1964 Letter from Lawrence M. Gilman, Gilman Realty Company to William S. Wise, Director, State of Ct., Water Resources Commission.
11. 28 April 1964 Letter from B. H. Palmer, of Chandler & Palmer to Mr. Wise, State of CT, Water Resources Commission.
12. 6 April 1964 Memo. from William P. Sander, Engr. Geologist to William S. Wise, Director (both of Water Resources, State of CT.).

APPENDIX B-2 - (cont.)

Copies of past inspection reports: (cont.)

- | | | | | |
|----|----|---------|------|---|
| 13 | 20 | March | 1963 | Letter from B. H. Palmer of Chandler & Palmer to Emitt A. Dell, State of CT., Water Resources Commission. |
| 14 | 31 | October | 1961 | Letter from B. H. Palmer of Chandler & Palmer to William S. Wise, State of CT., Water Resources Commission. |
| 15 | 31 | August | 1961 | Letter from B. H. Palmer of Chandler & Palmer to Emott A. Dell, State of CT., Water Resources Commission. |
| 16 | 16 | July | 1960 | Letter from B. H. Palmer to Mr. William S. Wise, State of CT., Water Resources Commission. |
| 17 | 13 | April | 1959 | Letter from B. H. Palmer of Chandler & Palmer to William S. Wise, State of CT, Water Resources Commission. |
| 18 | 11 | August | 1958 | Letter from B. H. Palmer of Chandler & Palmer to Bozrah Light and Power Company, Gilman, CT. |
| 19 | 7 | August | 1958 | Letter from Emitt A. Dell, State of CT., Water Resources Commission to B. H. Palmer of Chandler & Palmer. |
| 20 | 18 | October | 1948 | Letter from B. H. Palmer, member, State Bd. of Supervision of Dams to Richard Martin, Chmn. State Board of Supervision of Dams. |

STATE BOARD FOR THE SUPERVISION OF DAMS
INVENTORY DATA

CT 551

Name of Dam or Pond _____

Code No. Y 135 SH 11 BT 63 $41^{\circ} - 37' - 40'$

Location of Structure:

$72^{\circ} - 18'$

Town _____

Name of Stream RIVER STONE

U.S.G.S. Quad. 101 11 814

Owner C. L. H. _____

CH
7/73

Address _____

Pond Used For FISHING

Dimensions of Pond: Width _____ Length _____ Area 271 A

Total Length of Dam 200' / Length of Spillway 38'

Depth of Water Below Spillway Level (Downstream) 26'

Height of Abutments Above Spillway 2'

Type of Spillway Construction _____

Type of Dike Construction _____

Downstream Conditions _____

Summary of File Data 1963

Remarks

4/1/63 - 2nd Annual Inspection

1st - 1962

2nd - 1962

3rd - 1962

4th - 1962

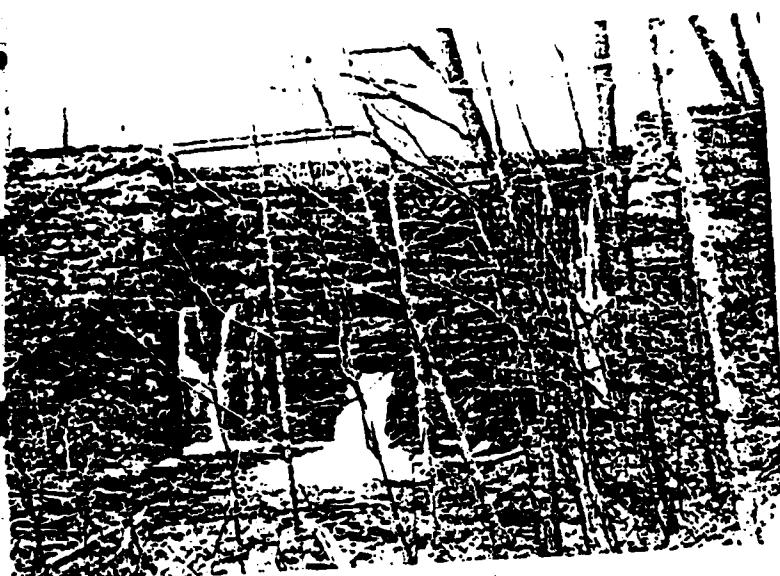
5th - 1962

6th - 1962

7th - 1962

8th - 1962

May 22, 1973 - checked
consultant - see file



MACCHI & HOFFMAN • ENGINEERS

EXECUTIVE OFFICES

44 GILLETT STREET

HARTFORD, CONN., 06105

PHONE (203) 549-6190

J. MACCHI, P.E.
JOSE H. COSIO, P.E.
MICHAEL GIRARD, P.E.

ASSOCIATE CONSULTANT
PROF. C. W. DUNHAM

May 14, 1974

State of Connecticut
Dept. of Environmental Protection
165 Capitol Avenue
Hartford, Conn. 06115

Attention Mr. Victor Galgowsky

Re: Lake Williams Dam
Lebanon, Conn.

Gentlemen:

As requested in your letter dated May 7, 1974, on Tuesday, May 14, 1974 I made another inspection of the above-referenced dam.

The structural condition of the dam remains unchanged and safe as observed in our inspections of the last three previous years. The leaks in the dam also remain in a stationary condition. Although the top stones under the concrete cap seem to be in a loose condition, they do not appear to be moving. However, we still strongly recommend that those cap stones be grouted.

Also, we recommend that inspection of this dam be re-scheduled for every two years unless extraordinary conditions arise.

Very truly yours,

MACCHI & HOFFMAN, ENGINEERS

Jose H. Cosio
JOSE H. COSIO, P.E.
CHIEF ENGINEER

WATER & RELATED
RESOURCES
RECEIVED

MAY 14 1974

ANSWERED _____
REFERRED _____
FILED _____

MACCHI & HOFFMAN • ENGINEERS

EXECUTIVE OFFICES • 44 GILLET STREETS • HARTFORD, CONN., 06105 • PHONE (203) 525-6631

J. MACCHI, P.E.
R. HOFFMAN, P.E.
MICHAEL GIRARD

ASSOCIATE CONSULTANT
JOHN C. W. DUNHAM

June 16, 1972

Dept. of Environmental Protection
State of Connecticut
State Office Building
Hartford, Connecticut 06115

Attention Mr. William H. O'Brien, III

Re: Lake Williams Dam
Lebanon, Conn.

Dear Mr. O'Brien:

In accordance with your letter dated June 13, 1972 Mr. A. J. Macchi and I made an inspection of the above-referenced dam on Thursday, June 16, 1972.

We find that as far as safety is concerned, the condition of the dam is physically the same as previously reported. There is no evidence of any increase in the leaks through the dam.

We recommend that another inspection be made in the Spring of 1973.

Very truly yours,

MACCHI & HOFFMAN, ENGINEERS

Jose H. Cosio
JOSE H. COSIO
CHIEF ENGINEER

WATER & RELATED
RESOURCES
RECEIVED

JUN 19 1972

ANSWERED _____
REFERRED _____
FILED _____

MACCHI & HOFFMAN • ENGINEERS

EXECUTIVE OFFICES • 44 GILLET STREETS • HARTFORD, CONN., 06105 • PHONE (203) 525-6631

J. MACCHI, P.E.
R. HOFFMAN, P.E.
CHARLES GIRARD

ASSOCIATE CONSULTANT
OF. C. W. DUNHAM

May 27, 1971

STATE WATER RESOURCES
COMMISSION
RECEIVED

MAY 28 1971

ANSWERED _____

REFERRED _____

FILED _____

Water Resources Commission
State of Connecticut
State Office Building
Hartford, Connecticut 06115

Attention Mr. William H. O'Brien, III

Re: Lake Williams Dam
Lebanon, Connecticut

Gentlemen:

A. J. Macchi and Peter Lozis of this office inspected the above-referenced dam on Wednesday, May 25, 1971.

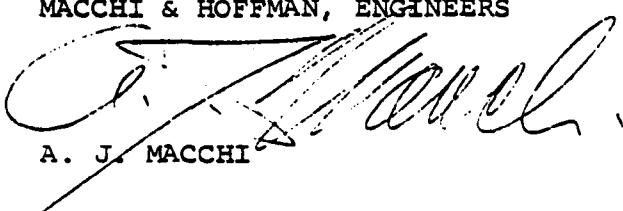
Large trees at the north abutment and bushes on face as referred to in our letter of March 29, 1968 have been removed as suggested.

The dam itself is found as previously reported, leaky, but, in a safe condition.

It is suggested that this dam be inspected in the Spring of every two years.

Very truly yours,

MACCHI & HOFFMAN, ENGINEERS


A. J. MACCHI

8/1/71

BENJAMIN H. PALMER
SHEPARD B. PALMER

CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE 887-8640

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WATER SUPPLIES
SEWERAGE
APPRaisALs
REPORTS
SURVEYS

MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

NORWICH, CONN. 06360

March 11, 1969

The Gilman Bros. Company
Gilman
Connecticut

Attention: Mr. Charles Gilman

Dear Sir:

Last Saturday I visited the Dam at Williams Pond. The pond was about one foot below full pond. There were some leaks in the Dam. There was so much snow and ice on the ground it was impossible for me to make a carefull examination.

As soon as the weather modifies somewhat I will do this and give you a detailed report. In the meantime, there is no danger insofar as the Dam is concerned. This can be considered a report of progress.

Very truly yours

S H Palmer

Chandler & Palmer

BHF:mds

J. MACCHI • ENGINEERS

EXECUTIVE OFFICES • 44 GILLETT STREET • HARTFORD, CONN., 06105 • PHONE 525-6631

A. MACCHI
R. HOFFMAN
J. SCHMID

ASSOCIATE CONSULTANT
JF. C. W. DUNHAM

March 29, 1968

Water Resources Commission
State of Connecticut
State Office Building
Hartford, Connecticut, 06115

Attention Mr. William H. O'Brien, III

Re: Lake Williams Dam
Lebanon, Connecticut

Gentlemen:

In accordance with your letter dated March 11, 1968
I made another inspection of the above-referenced dam on
Thursday, March 28, 1968.

Conditions were found to be the same as previously
reported on September 16, 1965; no changes have taken
place in the dam and no repairs have been made.

The dam is safe at the present time, however, I
am of the strong opinion that bushes growing on top of
the dam and the cluster of trees near the face of the
dam should be removed as soon as possible.

Very truly yours,

A. J. MACCHI, ENGINEERS



A. J. MACCHI

STATE WATER RESOURCES
COMMISSION
RECEIVED

APR 1 1968

ANSWERED _____
REFERRED _____
FILED _____

INTERDEPARTMENT MAIL

DATE

August 4, 1966

DEPARTMENT

Water Resources Commission

DEPARTMENT

Water Resources Commission

e
liam H. O'Brien, Civil Engineer

at Lake Williams - Town of Lebanon

On August 4, 1966 I called Mr. Benjamin Palmer of Chandler and Palmer, Engineers, Norwich, who is representing Gilman Brothers Company, owners of the dam. I told him that on August 2, 1966 I had visited the dam and found the water level within 1 foot of the top of the spillway with water flowing beneath the concrete cap of the spillway (about 18 inches below the top) and also water flowing from the same leaks on both sides of the dam near its base that were observed on our meeting at the dam on November 9, 1965. Mr. Palmer said that he would visit the dam and write to us of their intentions within the next week.

WHO: dj

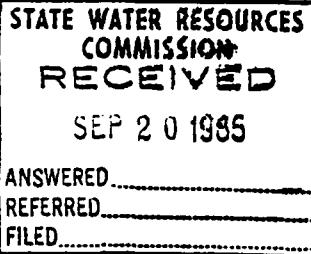
A. J. MACCHI • ENGINEERS

EXECUTIVE OFFICES • 44 GILLET STREETS • HARTFORD, CONN., 06105 • PHONE 325-6631

J. MACCHI
M. BINGHAM
R. HOFFMAN
R. SKOGLUND

SOCIATE CONSULTANT
ROF. C. W. DUNHAM

September 16, 1965



Water Resources Commission
State Office Building
165 Capitol Avenue
Hartford, Connecticut

Re: Williams Pond Dam
Waterbury, Connecticut

Gentlemen:

Enclosed is our report of inspection on the above-referenced dam which was authorized by your letter dated September 10, 1965.

Very truly yours,

A. J. MACCHI, ENGINEERS

J. J. Schmid
J. J. SCHMID, P. E.

Encl.

REPORT OF INSPECTION OF
WILLIAMS POND DAM
WATERBURY, CONNECTICUT

SEPTEMBER 16, 1965

1) IDENTIFICATION

- A. Letter from Water Resources Commission dated September 10, 1965.
- B. Williams Pond Dam, Lebanon, Connecticut.
- C. Dam is located in the Columbia quadrangle, at N $41^{\circ}37'40''$, W $72^{\circ}18'$ (See enclosed sketch).
- D. Bozran Light & Power Co.
- E. Not known by this office.

2) FACTORS OF HAZARD

- A. Not applicable in this report.
- B. Discharge from the dam flows under Route 207, bridged by a structure with a 20' x 5' opening into Brewster Pond, 2000' downstream (Pond area - 70 Ac.).
- C. Sudden collapse of the dam would release quantities of stored water which could endanger several residential properties along the discharge channel, also flood Route 207 for a distance of several hundred feet.

3) STRUCTURE

- A. The structure consists of a stone wall with a 1:25 batter on the downstream face. It is backed by earth fill with a 4:1 to 6:1 slope on upstream face. Total height, about 25'. The spillway portion of the dam is composed of stone masonry on downstream side, backed by a concrete wall, total width on top 4.5', batter on upstream = 1:25. The dam is built across a ravine a total length about 200'.
- B. Foundation at center portion of dam appears to be ledge. The remaining part probably rests on boulders and cobbles.
- C. The 38' long by 2' high notched spillway has a capacity of about 350 C.F.S.
- D. If freeboard is not sustained, Route 207 at a length of about 300' plus the dam for a length of about 200' will act as a spillway.

REPORT OF INSPECTION OF
WILLIAMS POND DAM, LEBANON, CONN.

SEPTEMBER 16, 1965

3) STRUCTURE - Continued

- E. There are 3 small leaks in the joints of the stone masonry about $2\frac{1}{2}$ feet below crest of spillway and 1 leak at the bottom, 10' north of the dam centerline. All seepage is in the joints of the heavy stone masonry facing. Total leakage about 1 C.F.S. There is no displacement or other serious erosion at the dam.

4) HYDROLOGY

- A. Net drainage area - 1850 Acres.

B. Design discharge:

Izzard Method - 100 year storm frequency - 1050 C.F.S.
50 year storm frequency - 750 C.F.S.
Bur. of Pub. Rds. 50 year storm frequency - 750 C.F.S.

- C. Spillway capacity - 350 C.F.S.

- D. Considering the storage capacity of the dam, 26 million C.F.S. for a 2' rise, the capacity of the facilities will probably not be exceeded by a 100 year storm. Existing spillway is adequate.

5) SAFETY

- A. The dam appears safe at the present time.
- B. Leakage at joints in masonry at the observed locations may loosen stones in dam face in time.
- C. Further erosion could cause a washout of a 2.5' high portion of the weir.
- D. Dam will require periodic inspection.

6) REQUIREMENTS

- A. This office recommends that leaks in downstream face of stone masonry at top and bottom of dam as shown on elevation be grouted.
- B. Repair work is not urgent, but, should be made sometime within a year.
- C. There appears to exist no immediate hazard, however, repair as in "A" is advised.
- D. No other work seems necessary at the present time.

REPORT OF INSPECTION OF
WILLIAMS POND DA M, LEBANON, CONN.

SEPTEMBER 16, 1965

7) SUMMARY OF FACTS

Williams Pond Dam in Lebanon, Connecticut is a combination of stone masonry and earth fill dam. Leakage of about 1 C.F.S. in eroded joints of the stone masonry portion was observed at the time of inspection. The dam discharges into a brook, crossing Route 207. Some residential properties are close to the brook. No hazard appears to exist at the present time. Maximum height of the dam is about 25', extending across a ravine for a total length of about 200'. The present spillway and storage capacity appear adequate to handle floods of 100 year frequency.

8) CONCLUSION

It is our opinion that the dam is safe at the present time. The amount of leakage observed should not endanger the stability of the structure in the immediate future.

9) RECOMMENDATION

- A. It is recommended that a letter of advice be sent.
- B. Repair to dam is of no great urgency.
- C. Recommended repairs should be made within one year from time of inspection.

APPENDIX

Enclosed 2 sketches showing details of dam and other data.

MACARTHUR ENGINEERS HARTFORD CONNECTICUT

DATE 9/14/65 SUBJECT WILLIAMS POND DAM

CITY DATE LEBANON CONN.

SHEET NO. 1 OF 1

JOB NO. 1000

WATERSHED

AREA - 1900 AC.

STORAGE - 50 AC.

NET AREA - 1850 AC.

IZZARD METHOD, USING LF 0.5

Q_{100} - 1050 C.P.S.

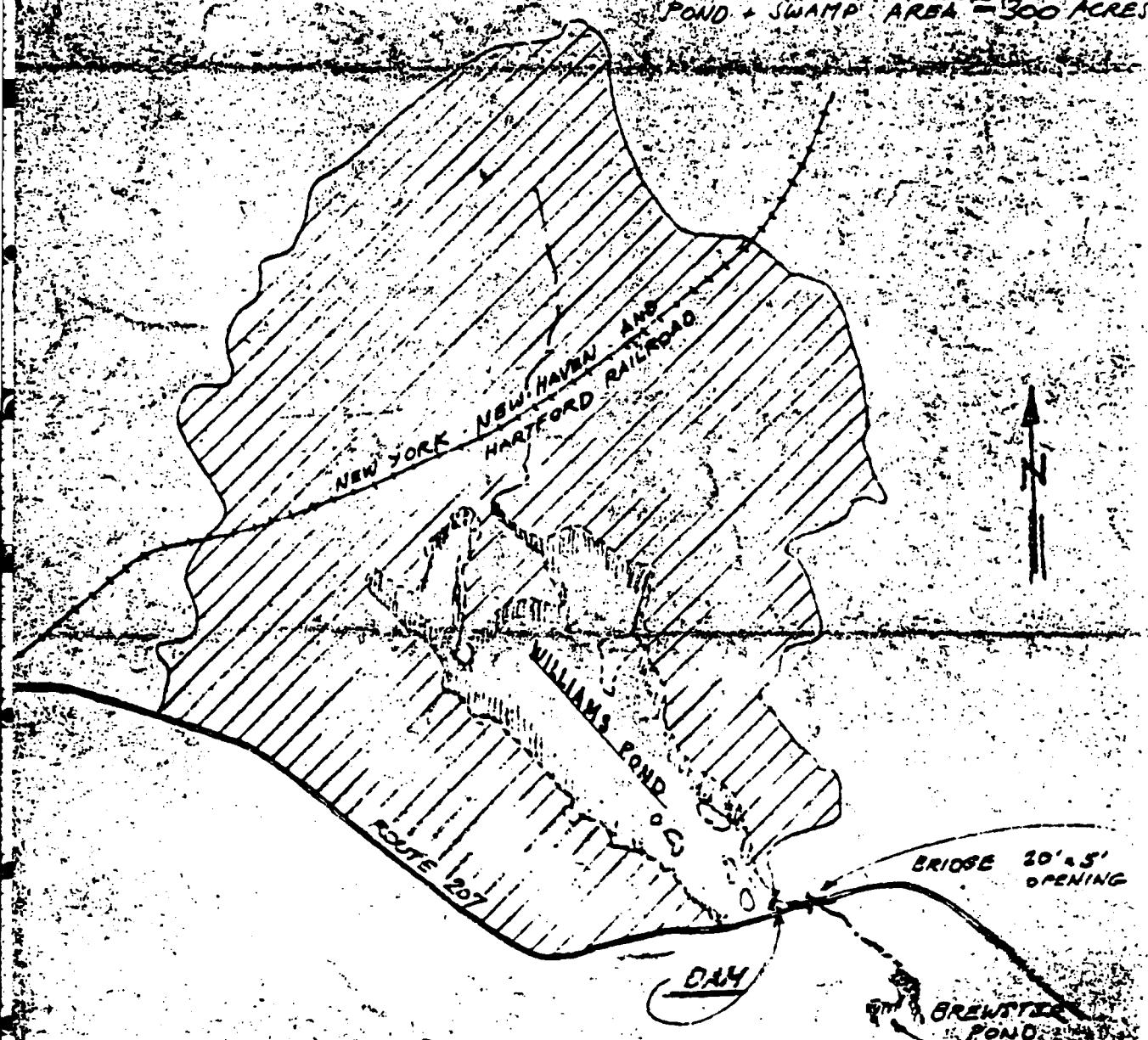
Q_{50} - 750 C.P.S.

BUREAU OF PUBLIC ROADS MANUAL

SERIES NO. 1000

Q_{50} - 750 C.P.S.

POND + SWAMP AREA = 300 ACRES



LOCATION PLAN

1" = 2000'

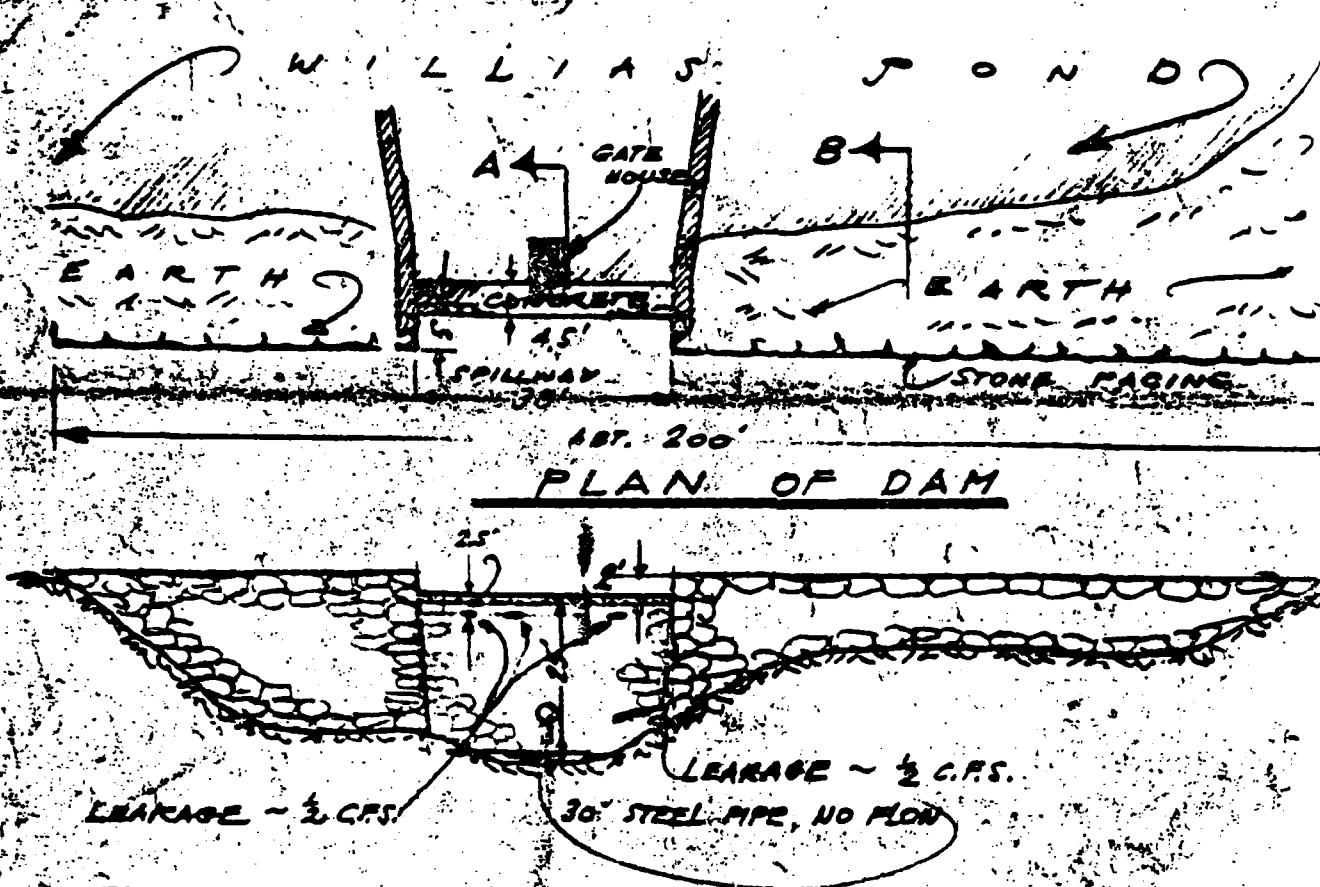
J. MACCHI

ENGINEERS

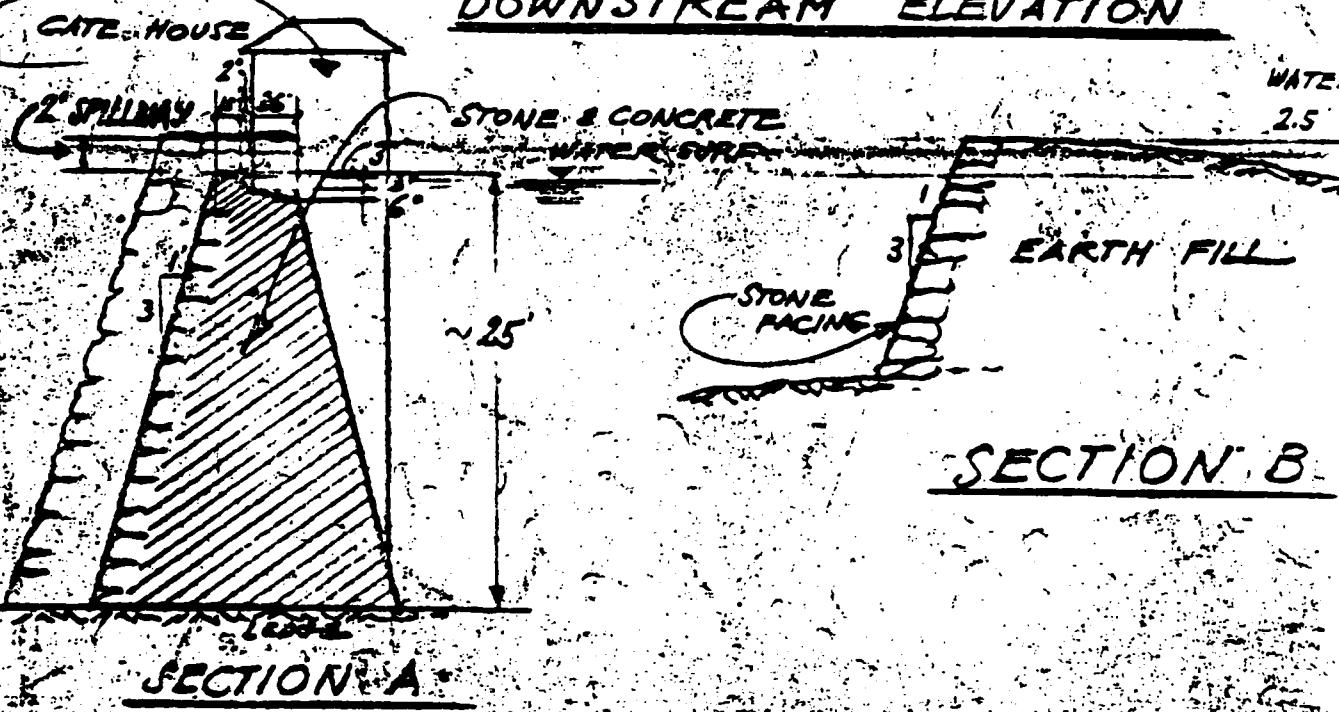
HARTFORD, CONN.

BY J. F. S. DATE 9-14-65 SUBJECT WILLIAMS POND DAM
CHECKED BY DATE LEBANON, CONN.

SHEET NO. 2 OF 2
JOB NO.



DOWNSTREAM ELEVATION



INTERDEPARTMENT MAIL

DATE September 9, 1965

John J. Curry, Chief Engineer

DEPARTMENT

Water Resources Commission

William P. Sander, Engineer - Geologist

DEPARTMENT

Water Resources Commission

Williams Pond Dam - Lebanon

On September 8, 1965 an inspection was made of the Williams Pond Dam in Lebanon. It was reported that there was a serious leak in the dam.

The inspection showed five leaks with a flow of perhaps $\frac{1}{2}$ c.f.s. There are two very minor leaks under the spillway cap and three larger leaks at the base of the dam. The largest of these, on the north abutment, appears to have started or increased since my last inspection on April 6, 1964. There are still trees on the south abutment.

The water coming from the major leak is clear with no evidence of material being carried through the dam. I think that one of our consultants should make an inspection however, then we could properly advise the owner.

W.Sander

WPS:js

THE GILMAN REALTY COMPANY

AC
WPS

Gilman, Connecticut

June 1, 1964

STATE WATER RESOURCE
COMMISSION
RECEIVED

JUN 3 1964

ANSWERED.....
REFERRED.....
FILED.....

Mr. William S. Wise, Director
State of Connecticut
Water Resources Commission
State Office Building
Hartford 15, Connecticut

Re: Williams Pond Dam

Dear Mr. Wise:

To bring your records up to date, and in accordance with your request of May 21st, kindly be advised as follows:

An inspection of the dam was made on June 5, 1963 by the engineers of Gunite Restoration Co., Inc., 595 Broadway, Malden, Massachusetts. Their engineering report of work to be done follows:

"The wingwalls appear to be in good condition without leakage and the stones are in position. There is some small vegetation growth on the stones, but nothing serious.

The downstream face (fieldstone) is the section that concerns us. There are two leaks through the face of this dam. The leak on the left-hand side (facing downstream) is the larger of the two and a considerable amount of water is flowing through. If this is allowed to continue, movement of the dam can result during the winter months due to build-up of ice and expansion of ice in dislodging the stones.

To repair the face of this dam, we would inject into the dam a cement grout containing quickset materials to seal off these leaks and then encase the entire downstream face with Gunite."

Following this report, we directed that company to go ahead with this work on July 8, 1963. They completed this work in the late Fall of the same year.

Under the circumstances, we feel we carried out the dictates of the engineering report as to the need for repairs on our dam. Accord-

Mr. William S. Wise, Director -2-
State of Connecticut
Water Resources Commission

June 1, 1964

ingly we would like to have a certification from your office as to the condition of the dam at the present time.

Very truly yours,

THE GILMAN REALTY COMPANY


Lawrence M. Gilman, Vice President

lmg/mm

JAMIN H. PALMER
FARD B. PALMER

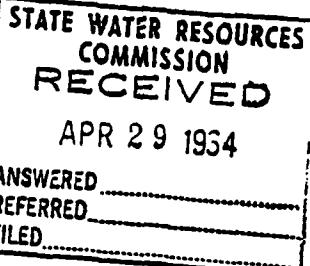
CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE 887-5640

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MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

NORWICH, CONN.

April 28, 1964



State Water Resources Commission
State Office Building
Hartford 15, Connecticut

Attn: Mr. Wise

Re: Williams Pond

Dear Sir:

At the request of Mr. Gilman of Bozrah, I visited the Williams Pond in the Town of Lebanon on last Saturday. The pond was about 10" below full pond.

About a year ago, the Owner had the face of the dam treated with "G'unit". This stopped many leaks but they did not carry the treatment all the way to the top and there are several leaks about 2 feet below the crest of the dam. Also, one leak near the base of the dam at the North side.

There are several large trees on the embankment on the North side of the spillway and I think that these should be removed. They constitute a hazard in the event of a high wind storm.

Although there are still leaks at the spillway, I think the condition is better than it was a year ago and I do not personally feel concerned about its safety. I do not want to countermand anything you have said, so I am writing this directly to you.

Very truly yours,

CHANDLER & PALMER,

B.H. Palmer

Benjamin H. Palmer

BHP/MAM

DATE April 6, 1964

INTERDEPARTMENT MAIL

William S. Wise, Director	DEPARTMENT Water Resources
William P. Sander, Engineer-Geologist	DEPARTMENT Water Resources
ECT	

Williams Lake Dam - Lebanon

On this date I visited the Williams Lake Dam in Lebanon to determine the present condition of the dam. The owner reported that he had repaired the dam during 1963.

The dam appeared to have been Gunnited as the owner reported. There was, however, some leakage noted at the base of the dam at the south abutment and also under the spillway capstone. I do not feel that these leaks should be of great concern.

There are a number of large trees on the dam and this condition is a matter of concern. These trees should be removed to prevent their blowing over during a wind storm and initiating a progressive failure of the dam.

W.P. Sander

JAMIN H. PALMER
EPARD B. PALMER

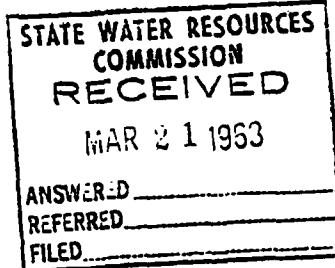
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CIVIL ENGINEERS
114-116 THAYER BUILDING
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NORWICH, CONN.

March 20, 1963



Mr. Emitt A. Dell
Field Inspector
State Water Resources Commission
State Office Building
Hartford (15) Connecticut

Dear Sir:-

This morning, March 20th, I made an inspection of Williams Pond in Lebanon which is owned by Gilman Brothers of Gilman, Connecticut.

I have made various inspections at different times on this dam. There are still substantial leaks occurring through the stone masonry on the downstream face of the spillway. On the Northerly end of the spillway the leaks occur about 3 feet down from the top and on the Southerly side they are about 6 feet down from the top. There is no evidence of gravel or material washing through but the leaks are substantial and the work which the Gilman Brothers did last year in trying to stop these leaks has not proved very effective.

I called Mr. Charles Gilman this morning and he has agreed to open the gate and draw the pond down at least 2 feet. I feel that this measure is desirable and he has agreed to do it. He also has agreed that substantial repairs will have to be made later on and he will make preparations for doing them in the Spring.

I am not concerned about the safety of the dam but feel it is desirable to keep the water below full pond.

Very truly yours,

BHP/ew

BHP/ew

CHANDLER & PALMER

CIVIL ENGINEERS

114-116 THAYER BUILDING

TELEPHONE TURNER 7-5640

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MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

NORWICH, CONN.

October 31, 1961

Re: Williams Pond
Lebanon, Connecticut

Mr. William S. Wise
State Water Commission
State Office Building
Hartford, Connecticut

Dear Sir:-

Several weeks ago Mr. Gilman of the Gilman Company opened the gate at my request on the Williams Pond and drew the pond down completely.

This is a stone dam fairly high and the spillway section has been backed up with a concrete covering. There were, however, a good many leaks coming through the stone facing at the spillway area.

After the pond was drawn down the side abutment walls upstream, which are of stone, were carefully repointed. I suggested that they be covered with concrete but Mr. Gilman did not want to go to that expense. At the present time the gate is closed and the pond slowly filling. I have visited the job once and I note that there are still some leaks but they do not appear to be as bad as before. I do not think this is any emergency and I will keep in touch with the situation from time to time.

Very truly yours,

B.H. Palmer

BHP/ew

3-12-63

W.S.W. REQUESTS PAPER
TO LEANON & SUBMIT REPORT

STATE WATER RESOURCES
COMMISSION
RECEIVED
NOV 1 1961

ANSWERED.....
R F RRED.....
FWD.....

CHANDLER & PALMER

CIVIL ENGINEERS

114-116 THAYER BUILDING

TELEPHONE TURNER 7-5640

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MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

NORWICH, CONN.

August 31, 1961
Re: Williams Pond
Lebanon, Connecticut

State of Connecticut
Water Resources Commission
State Office Building
Hartford (15) Connecticut.

Attention: Mr. Emitt A. Dell
Field Inspector

Dear Sir:-

In reply to your letter dated August 7, 1961 relative to the Williams Pond, I would say that this morning I visited the pond in Lebanon in company with Mr. Lawrence Gilman of Gilman Bros., the Owners of the Dam and Pond.

As I have stated a number of times previously, this is a stone dam and there are numerous leaks through the spillway section which occur from the top down to a depth of 6 feet or 8 feet. There was considerable water coming through these leaks and the pond was about 18 inches below full pond. I still am not concerned over the safety of the dam but I agree that the leaks are substantial and I believe they should be fixed. Mr. Gilman agreed that as soon as possible after Labor Day he would draw the pond down 5 or 6 feet and repair the leaks either by pointing up the masonry wall or by putting a concrete facing on the upstream side. He has agreed to notify me when the pond is down and I will make a further inspection at that time. It is rather difficult at present to know what is the best way to fix it until the water is considerably lower.

In any event we expect to take the necessary steps to repair the leaks this Fall before the winter weather starts in. Mr. Gilman was very cooperative and has agreed to do the work outlined above. I do not think you can quite close your file yet on this matter but I am keeping in touch with it and when the work is completed I will report to you.

Very truly yours,

BHP/ew



STATE OF CONNECTICUT
STATE BOARD FOR THE SUPERVISION OF DAMS
317 STATE OFFICE BUILDING, HARTFORD 15

July 16, 1960

Mr. William S. Wise
Director
State Water Resources Commission
Hartford (15) Connecticut

Dear Sir:-

I have today made an inspection of the dam at Williams Pond in Lebanon. I have made several previous reports on this.

The dam still has bad leaks in it and the water was down about 1 foot from full pond. I can see no evidence that the condition is any worse than it has been before. The pond is used for summer sports and bathing and each year the neighbors get concerned when the water gets a little low. These people, of course, contribute nothing to the dam maintenance but expect Gilman Bros. to do it for them.

I will, however, after Labor Day contact Mr. Gilman and see if we can put in some clay fill that may stop the leaks or lessen them. I do not think from the State's standpoint that we should be concerned about it.

Very truly yours,

B H Palmer

BHP/ew

STATE WATER RESOURCES
COMMISSION
RECEIVED
JUL 10 1960
ANSWERED
REFERRED
FILED

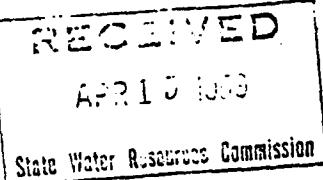
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TELEPHONE TURNER 7-5640

benjamin H. PALMER
BENARD S. PALMER

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MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

NORWICH, CONN.
April 13, 1959



Mr. William S. Wise
Chairman, State Water Resources Commission
State Office Building
Hartford, Connecticut

Dear Mr. Wise:-

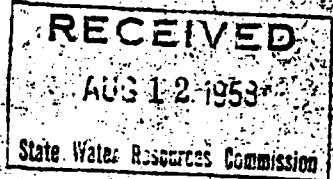
I understand that you called the other day regarding the Williams Pond at Lebanon. On last Saturday I visited the site and found that water was spilling over the spillway, so that it was not possible to examine very closely the leaks coming through the face of the dam. I have at one or two times before this examined it and there are a number of leaks pretty well down on the face of the dam. However, I can say that I do not think that the dam is in danger of failure. There is no evidence that the leaks are getting any worse and there is no bulging of the stonework. I talked with Mr. Charles Gilman of Gilman Brothers and he wants to be cooperative but does not feel that there is any particular danger involved. The people who use the pond for swimming purposes appear to be the ones that are making the fuss but, of course, they do not want to contribute anything to the expense of fixing the dam. I do not think that there is any immediate danger as far as failure of the dam is concerned.

I am planning to go away on Wednesday, April 15th, for a few weeks. If you feel that it is something that needs immediate attention I would suggest that you have Mr. Buck or someone else look it over. I do not think anything would happen if it waited until I returned but I will leave the matter in your hands.

Very truly yours,

BSPalmer

BHP/ew



August 11, 1958

Bozrah Light & Power Co.
Gilman, Connecticut

Gentlemen:-

Last Saturday at the request of the State I visited the Williams Lake Dam in the Town of Lebanon and made an inspection of the dam. There are a number of serious leaks in this dam.

At the time of my visit the water was about 2" below full pond and nothing was going over the top of the spillway. However, there were serious leaks in the spillway with water coming through the joints in the stone for a depth of about 15' down from the level of the spillway. The most serious leaks occur on the Northerly and Southerly ends of the spillway section. So much water was coming through that I would expect that in a dry season the pond would be practically empty. If these leaks are allowed to continue they will take enough material through the joints so that there is a possibility that the dam might fail. My suggestion is as follows.

That you make definite plans to correct this condition during September and October of this year following the summer season when the people around there use the pond for bathing. I think it will be necessary to draw the pond down and stop the leaks from the Jack side of the dam. This may be done by excavating in back of the masonry and filling in with concrete or it might be done by driving some sheet piling as close as possible to the upper side of the dam. I doubt if dumping clay in there would be enough to stop these leaks which are quite sizeable. Probably when the pond is pulled down there would be a better chance to see what the conditions are there.

Will you kindly let me have a letter as to what you propose to do on this, as I feel that it is a matter that should be attended to and that there is some question as to the safety of the dam. It is not something that should be put off beyond this Fall. I will expect a letter from you in the near future.

Very truly yours,

B. H. Palmer

BHP/cw



STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
State Office Building • Hartford 15, CONNECTICUT

August 27, 1953

RECEIVED
AUG 27 1953
State Water Resources Commission

Mr. Edward W. L. Johnson
Division of Water Resources
State Water Resources Commission

Dear Mr. Johnson:

I enclose copy of the enclosed letter from Mr. W. H. Johnson. I made a quick trip to the State Office Building, 20 Atlantic Avenue, New Haven, last Friday evening, and spoke with Mr. Johnson about the proposed legislation. He was very helpful and gave me some good advice.

Enclosed herewith is a copy of the proposed bill, which I have added some minor changes to. I hope you will be able to get it passed.

E. A. Steele (pt)

cc: [unclear]

cc: [unclear]

cc: [unclear]

STATE OF CONNECTICUT



STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

STATE WATER COMMISSION

1948

Mr. H. P. Palmer

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

PLEASE REPLY TO
October 18, 1948

Mr. Richard Martin
Chairman, State Board of Supervision of Dams
State Office Building
Hartford, Connecticut

Dear Mr. Martin:-

I visited the Williams Lake Dam yesterday afternoon and found that the water had all been drawn off and that they were starting to make repairs to the Dam. I talked this morning with Mr. Lawrence Gilman and he said that his company was having the work done. They propose to put in a new 3' x 3' steel sluice-gate with new gate stem and wheel and also propose to face up the back of the masonry dam with concrete to stop some of the leaks.

I cautioned Mr. Gilman not to increase the height of the crest of the spillway as I think it is already plenty high. Apparently some years ago there were wooden flashboards on the dam and these were taken off and replaced with a concrete section which is permanent. My understanding is that the repair work now contemplated will not raise the height of the spillway and for that reason I do not think any special permit need be issued for these repairs inasmuch as we are not changing the condition from what it is now.

I will plan to take a ride up there occasionally and see the work as it progresses.

Very truly yours,

B. H. Palmer

Member, State Board of Supervision of Dams

BHP/EW

CHRONOLOGY OF CORRESPONDENCE

<u>DATE</u>	<u>DESCRIPTION</u>
7 May, 1974	Request for Inspection-State of Connecticut to Macchi-Hoffman, Engineers
13 June, 1972	Request for Inspection-State of Connecticut to Macchi-Hoffman, Engineers
15 April, 1971	Request for report from engineers-State of Connecticut to Owner
8 April, 1971	Request for Inspection-State of Connecticut to Macchi-Hoffman, Engineers
13 March, 1969	Correspondence - Reply from Owner to State regarding report
12 March, 1969	Letter of transmittal for progress report on inspection
26 Feb., 1969	Submittal of two reports of inspection
26 Feb., 1969	Request for Inspection-State of Connecticut to Owner
5 June, 1968	Correspondence-State to Owner
4 April, 1968	Report of Inspection-State to Owner
11 March, 1968	Correspondence-State to A.J.Macchi, Engrs. report on inspection
9 Nov., 1965	Report on meeting at Dam-A.J.Macchi, Engrs. to State
9 Nov., 1965	Report on meeting-C.H.Palmer to Owner
26 Oct., 1965	Correspondence-Owner to State regarding condition of dam
20 Sept., 1965	Report on inspection-State to Owner
10 Sept., 1965	Request for inspection-State to A.J.Macchi, Engrs.

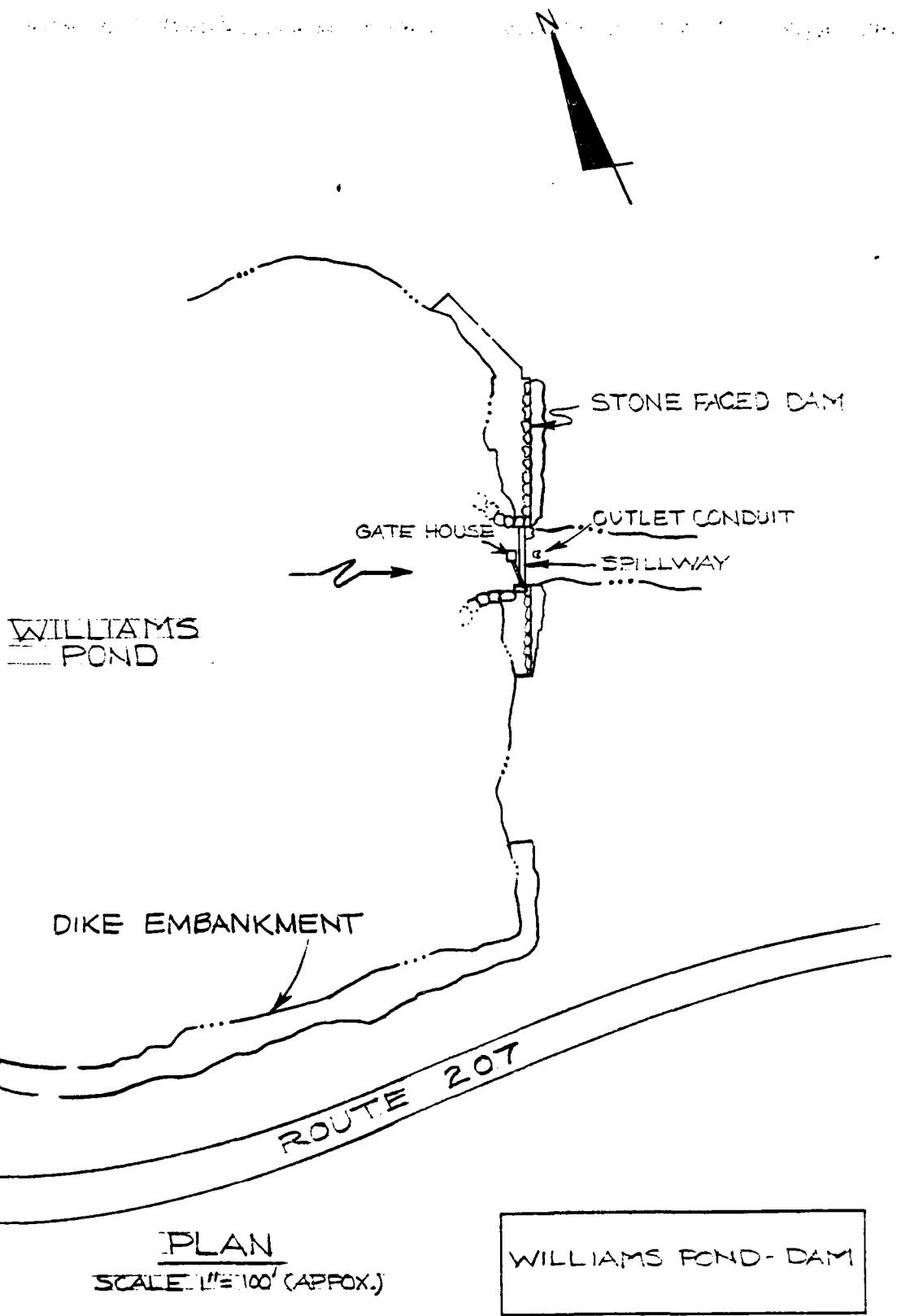
CHRONOLOGY OF CORRESPONDENCE (continued)

<u>DATE</u>	<u>DESCRIPTION</u>
23 July, 1964	Correspondence-Owner to State of Connecticut
2 July, 1964	Correspondence-State to Owner on condition of dam
21 April, 1964	Correspondence-Owner to State-Repairs to Dam
1 May, 1961	Correspondence-Lake Williams Assoc. to State-report of leak
30 Nov., 1960	Correspondence-Lake Williams Assoc. to State-report of leak

APPENDIX B-3

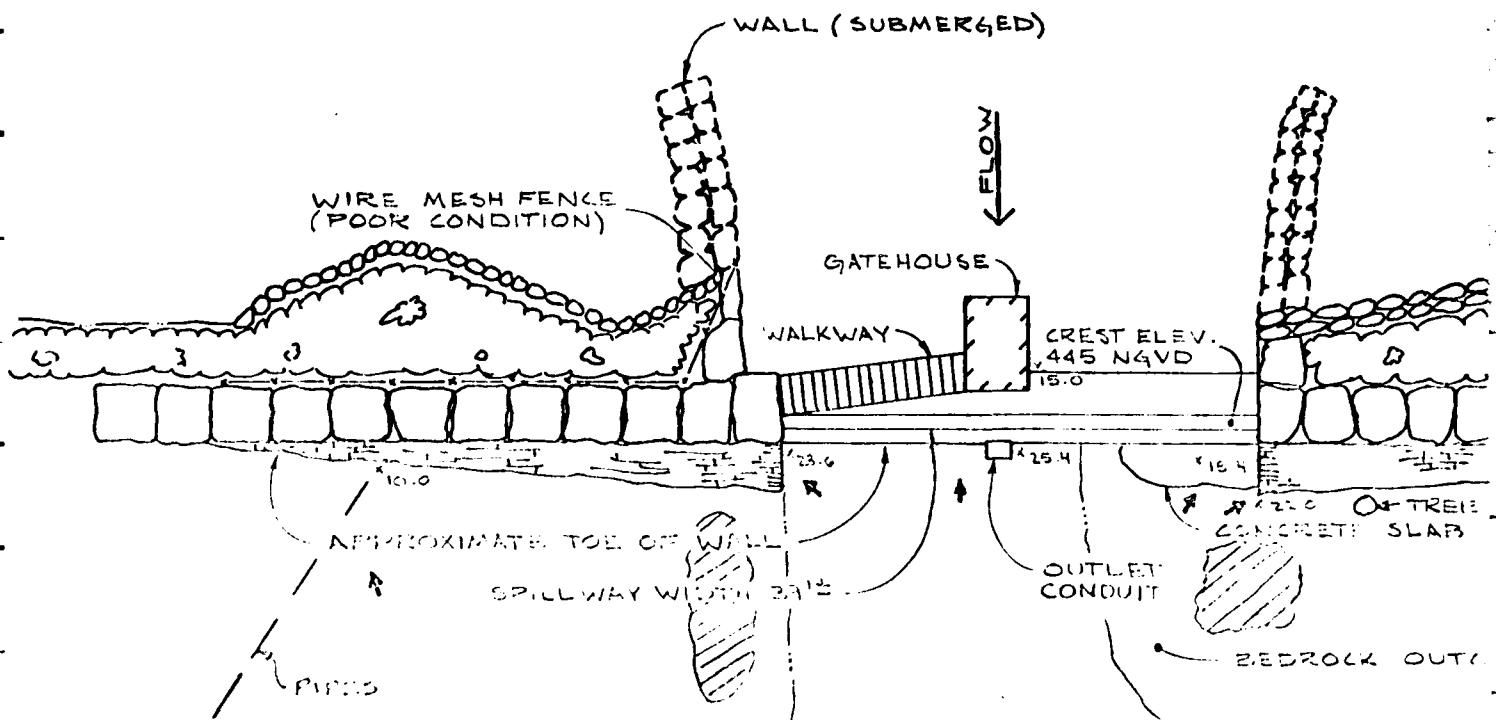
Sketches prepared by C-E Maguire
based on field inspection.

Sketches are approximate only.



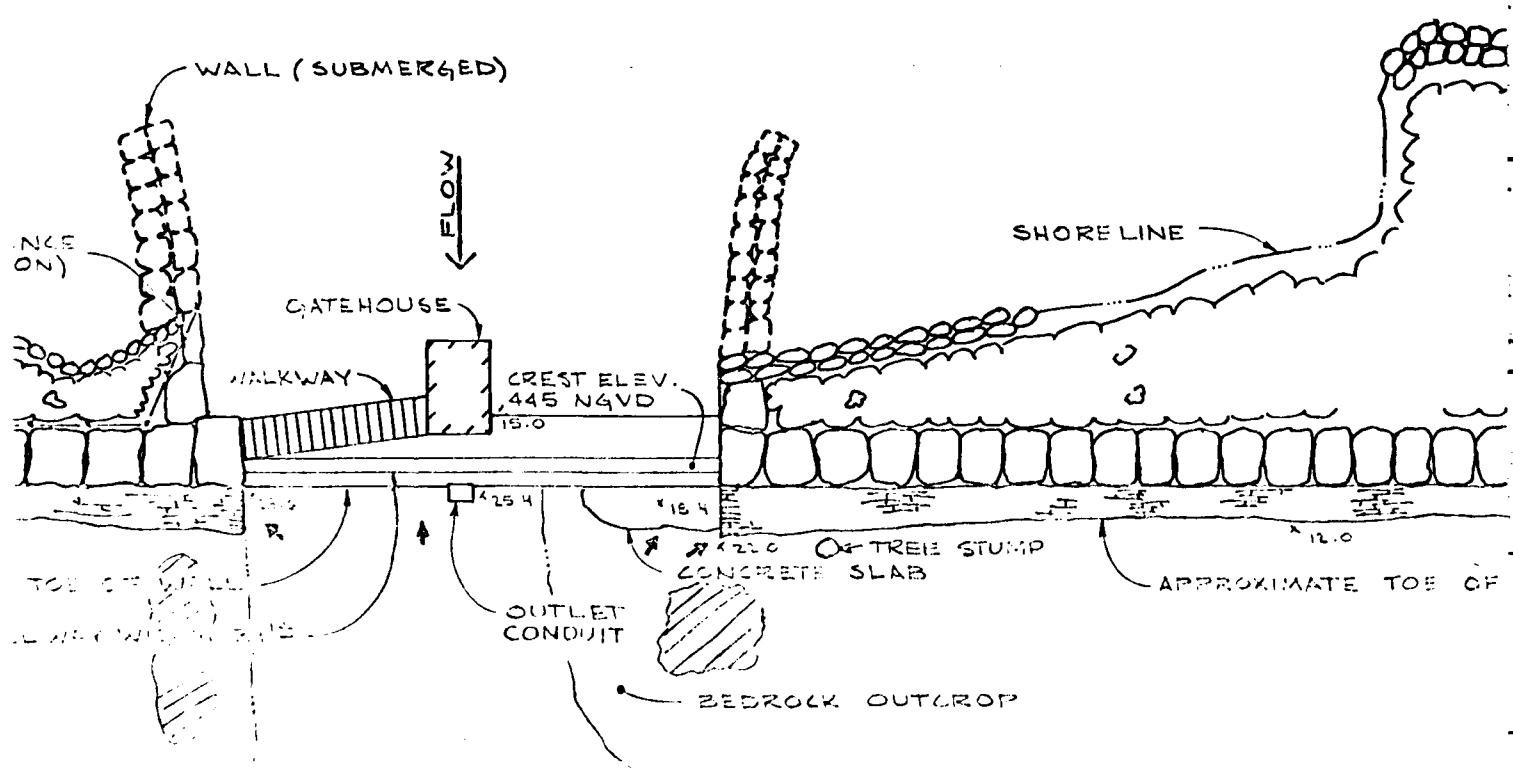
WILLIAMS

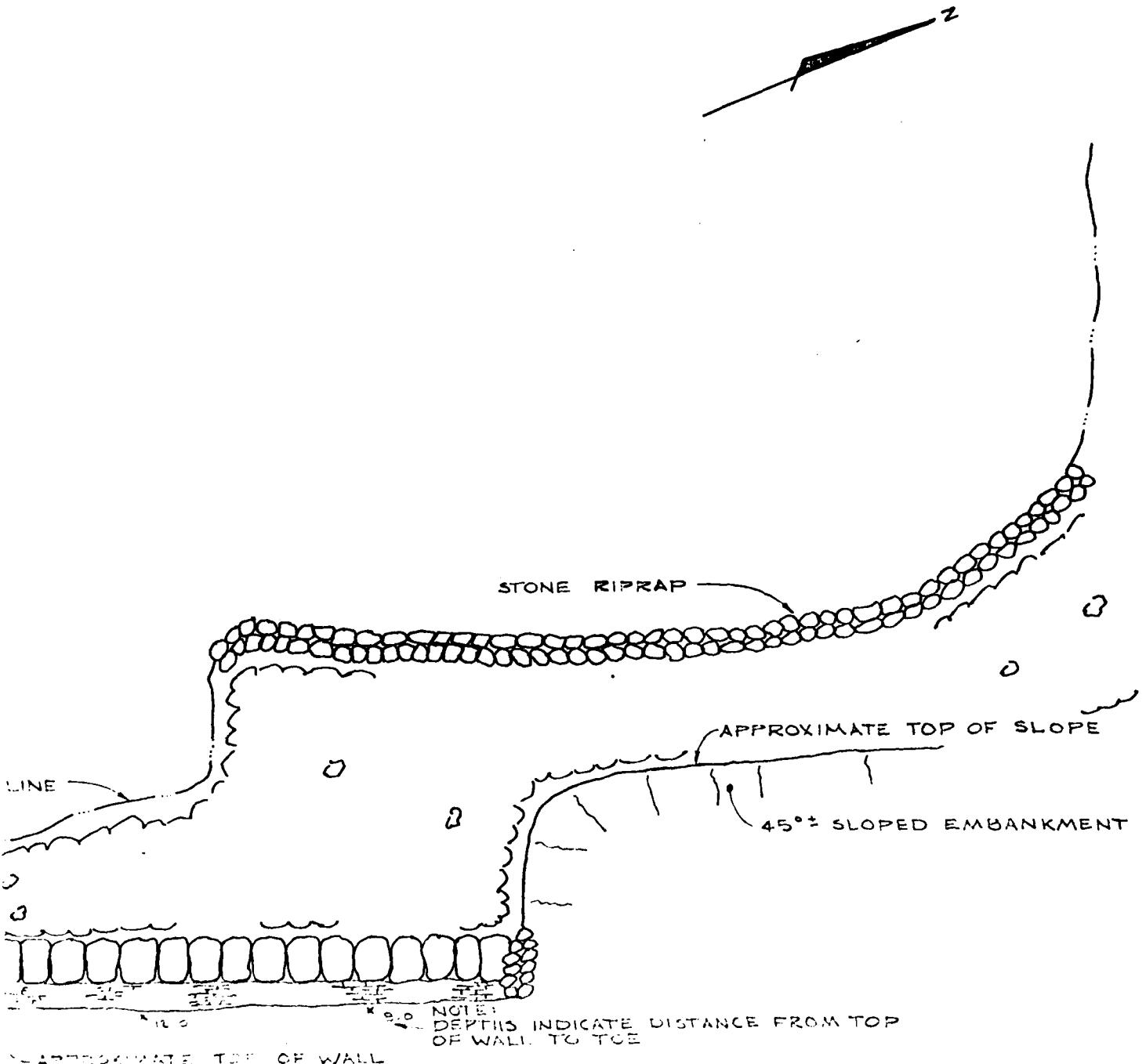
POND



WILLIAMS

POND

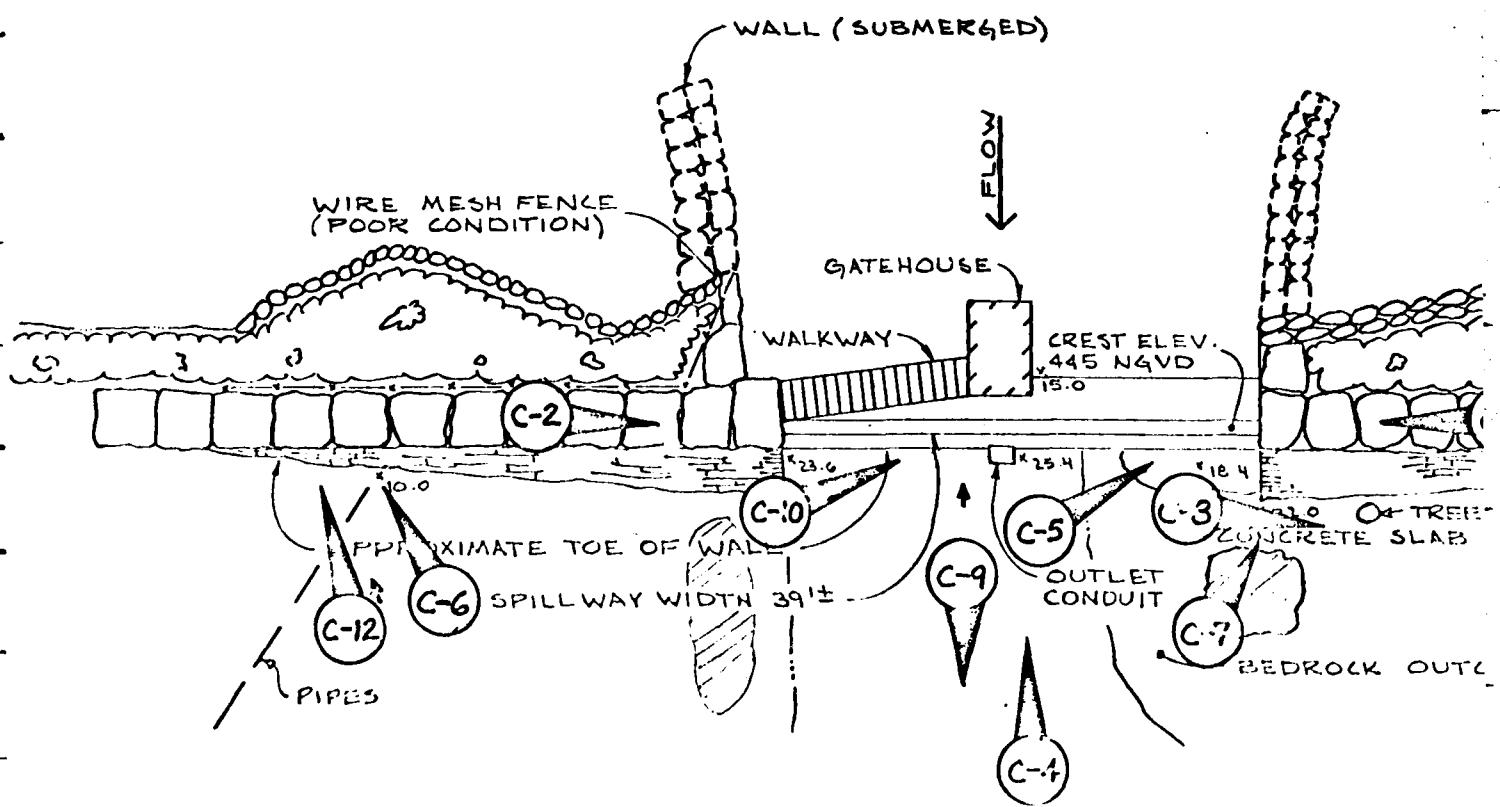




APPENDIX C
SELECTED PHOTOGRAPHS

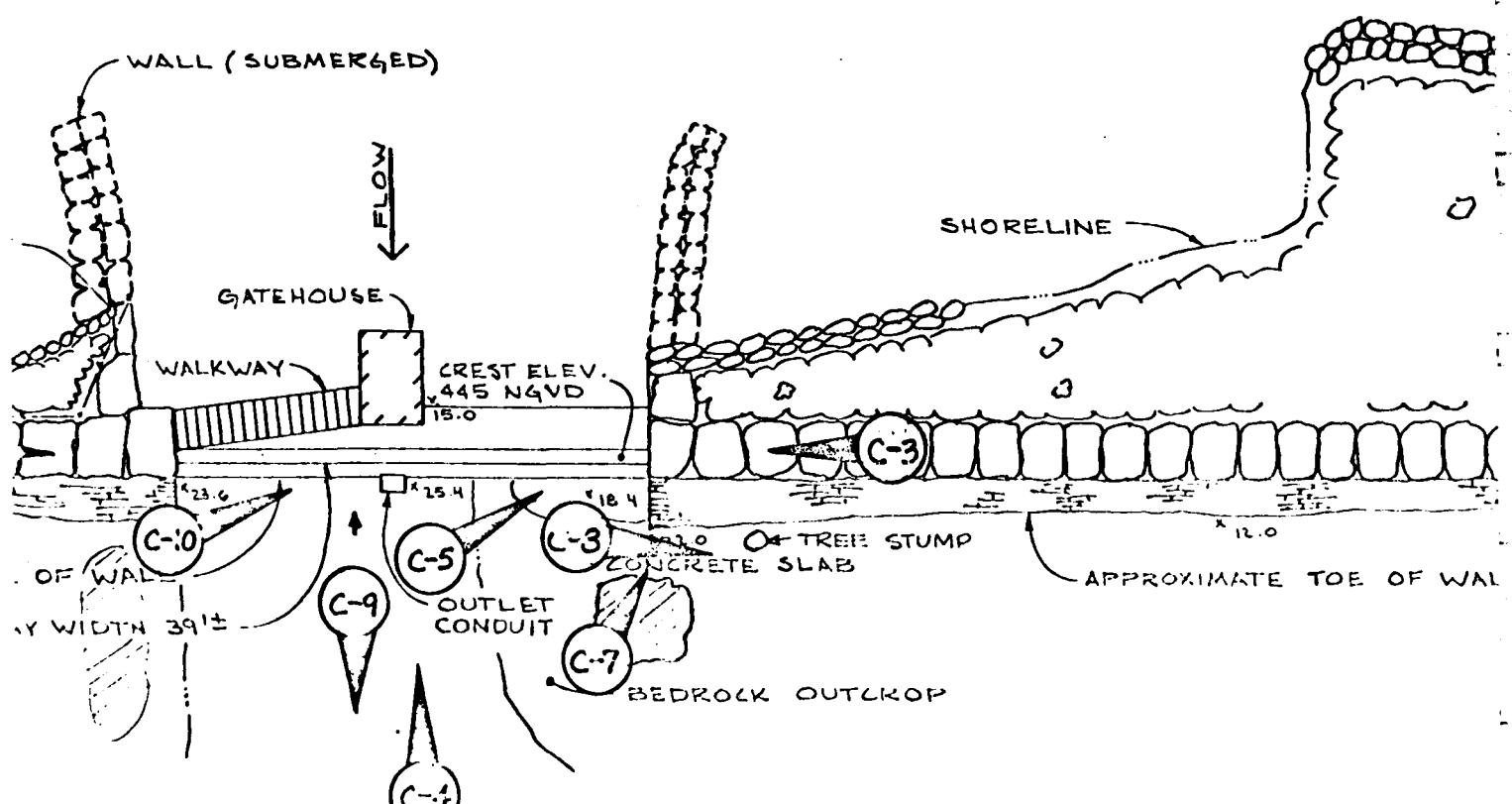
WILLIAMS

POND

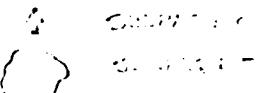


WILLIAMS

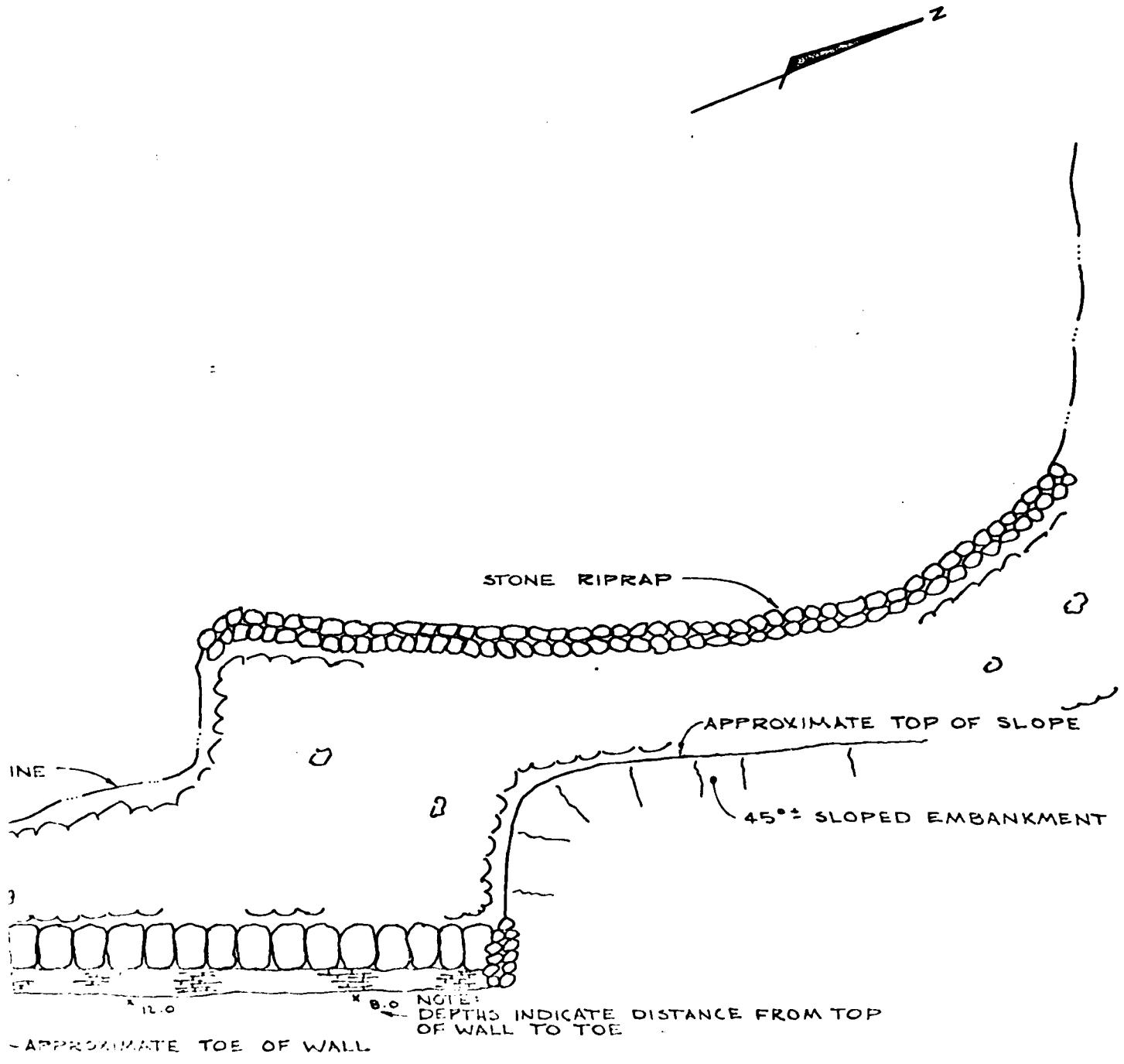
POND



LEGEND



(2)



LEGEND

- 1) SPILLWAY GATEWAY
- { } CHANNEL ZONE

PHOTOGRAPH INDEX

WILLIAMS POND DAM
Spillway & Culvert

0 10' 20'

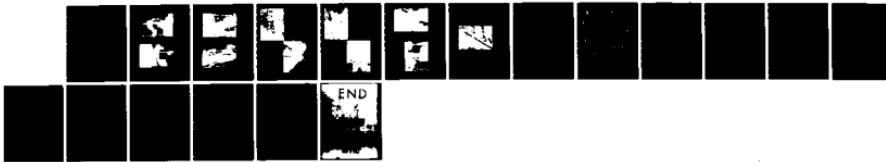
(3)

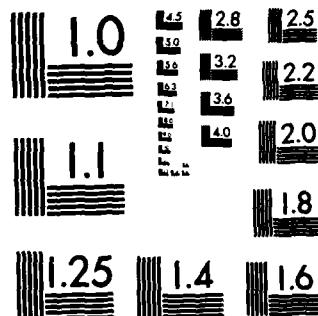
AD-A144 608 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 2/2
WILLIAMS POND DAM (CT. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV OCT 78

UNCLASSIFIED

F/G 13/13

NL

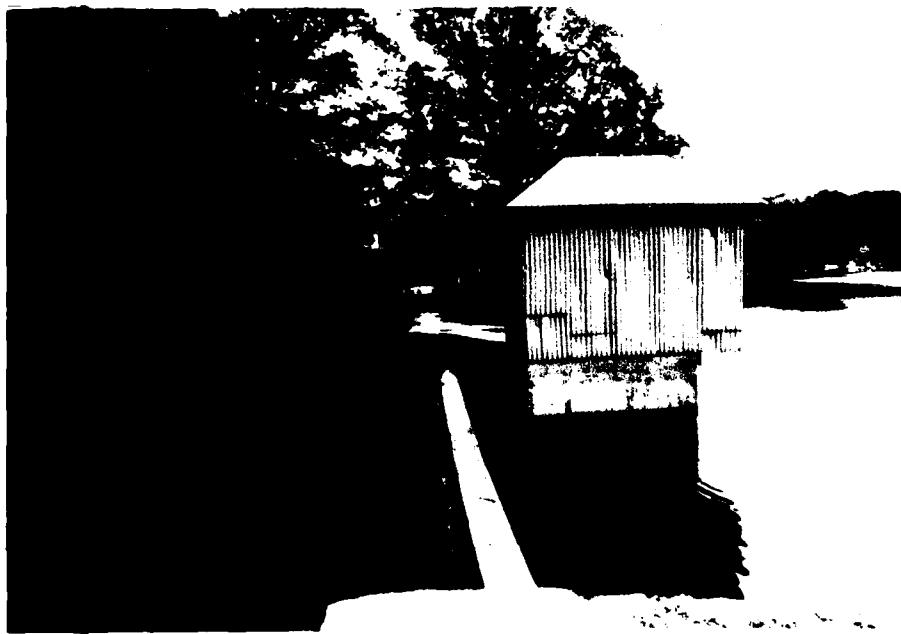




MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



C-2 SPILLWAY AND GATEHOUSE (LOOKING FROM THE RIGHT ABUTMENT TO THE LEFT.)



C-3 SPILLWAY AND GATEHOUSE (LOOKING FROM LEFT ABUTMENT TO RIGHT ABUTMENT.)



C-4 DOWNSTREAM FACE OF DAM (NOTE: OUTLET PIPE AT CENTER AND LEAKAGE THROUGH THE MASONRY.)



C-5 SEEPAGE EMANATING FROM RIGHT SPILLWAY ABUTMENT



C-6 SEEPAGE NEAR RIGHT ABUTMENT.



C-7 SEEPAGE AT LEFT SPILLWAY ABUTMENT.



C-8 ROTTING TREE STUMP ALONG
DOWNSTREAM TOE NEAR LEFT
ABUTMENT.



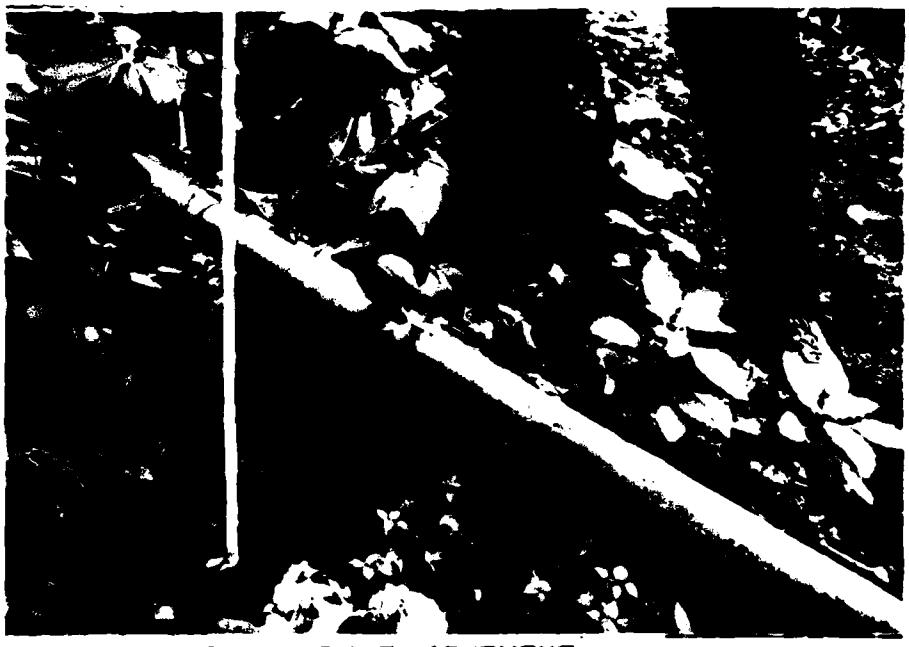
C-9 DOWNSTREAM SPILLWAY AND
OUTLET WORKS CHANNEL.



C-10 DOWNSTREAM FACE OF DAM (NOTE LEAKAGE THRU
MASONRY AND SEEPAGE AT LEFT SPILLWAY ABUTMENT.



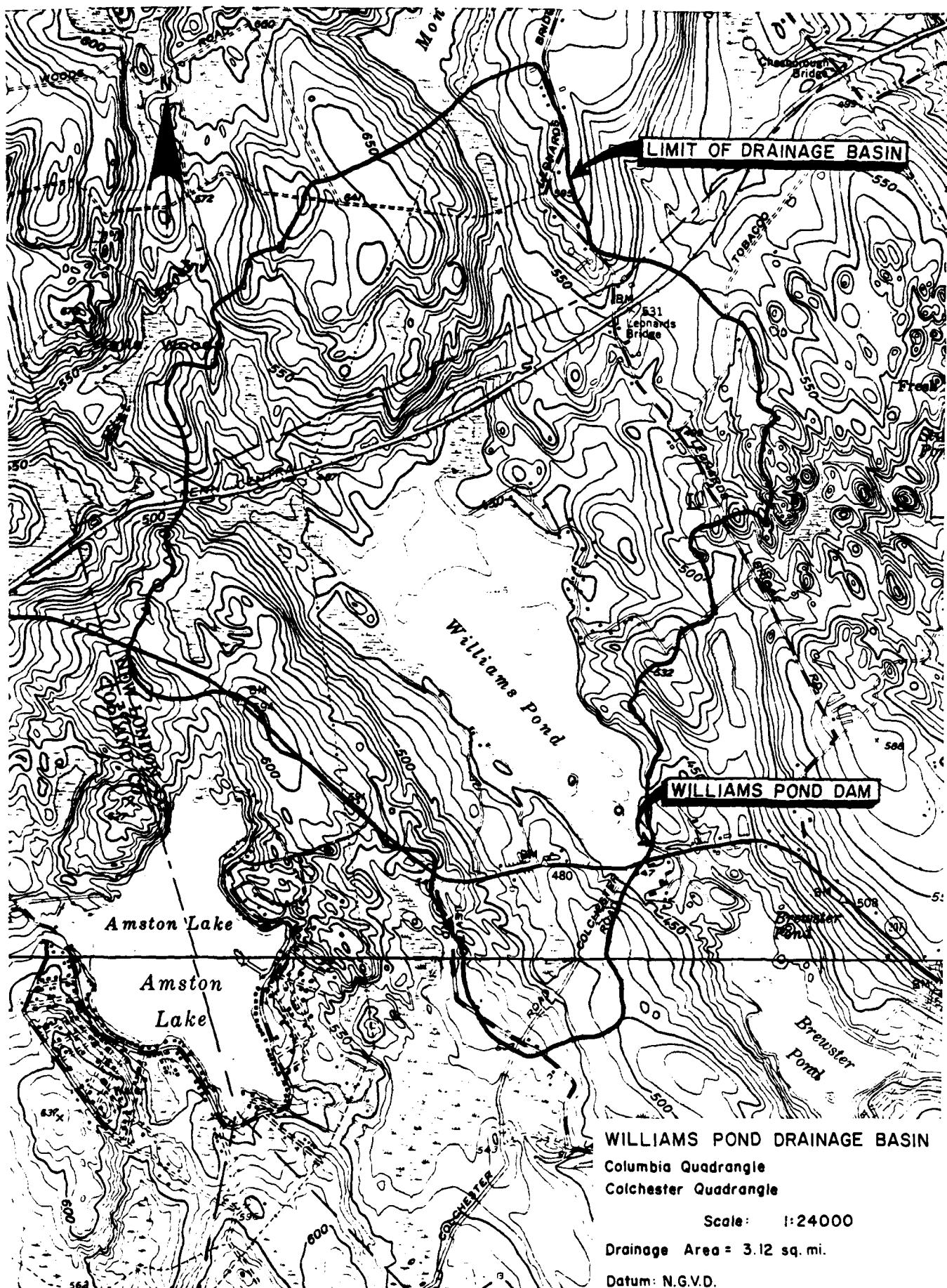
C-II TYPICAL SURFACE
EROSION AT DIKE FROM
TRESPASS.



C-12 SEEPAGE AT RIGHT ABUTMENT.

APPENDIX D

HYDROLOGIC/HYDRAULIC ANALYSIS



Scale: 1:24000

Drainage Area = 3.12 sq. mi.

Datum: N.G.V.D.

A. Size Classification

Height of Dam = 25.4 feet; Hence SMALL

at crest elevation reservoir storage = 3520 AC-ft., hence INTERMEDIATE

adopted size category INTERMEDIATE

B. Hazard Potential

DAM IS LOCATED IN A PREDOMINANTLY RURAL OR AGRICULTURAL AREA WHERE FAILURE OF DAM IS NOT LIKELY TO CAUSE DAMAGE TO LIFE BUT WILL INVOLVE APPRECIABLE ECONOMIC LOSS DUE TO LOSS OF RECREATIONAL FACILITIES AND USE OF PROCESS WATER DOWNSTREAM. FAILURE IS LIKELY TO BREACH RT. 207 AS WELL.

It is estimated from the rule of "thumb" failure hydrograph as follows:

<u>Category</u>	<u>Loss of Life</u>	<u>Economic Loss</u>
		Homes = NO
		Buildings = NO
<u>SIGNIFICANT</u>	NO	Farms = YES
		Miscellaneous = YES
		Highways or roads = YES

C. Hazard Size "Test Flood" or Spillway Design Flood

SIGNIFICANT INTERMEDIATE Y_2 PMF TO PMF

Adopted S.D.F. (test flood) = Y_2 PMF

Adopted value of test flood due to watershed characteristics = 1000 CSM

Estimating Maximum Probable Discharges - Inflow and Outflow Values

Date of Inspection: 6/26/13

Name of Dam WILLIAMS LAKE DAM; Location of Dam CABIN BROOK Town LEBANON, CT.

ROLLING HILLS WITH SWAMPS

Adopted "test" flood = HALF PMF = 1000 CSM = 3120 C.F.S.

D.A. = Drainage Area = 3.12 Square Miles = Acres

S. A. = Surface Area of Reservoir = 0.41 Square Miles = 263 Acres

Shape and Type of Spillway = BROAD CRESTED - OVERFLOW - UNCONTROLLED

$$B = \text{Width of Spillway} = \underline{\underline{39.0}} \text{ feet; } C = \text{Coefficient of Discharge} = (\underline{\underline{3.33 - \text{Friction}}}) = \underline{\underline{3.00}}$$

Maximum Capacity of Spillway Without Overtopping = 283 C.F.S. = 9 % of test flow

Top of Dam Elevation = 446.80; Spillway Crest Elevation = 445.00

NOTE: Outflow discharge values are computed as per C.O.E. guidelines but with due consideration given to storage in reservoir and maximum spillway capacity.

Δp = discharge; h = surcharge height S = Storage in inches

Overtopping Potential

Spillway crest elevation = 445.00 M.S.L.

Top of dam elevation = 446.80 M.S.L.

Maximum discharge capacity of)
Spillway without overtopping) = 282 C.F.S.

"Test flood" outflow discharge = 1726 C.F.S.

% of "Test flood" carried by)
Spillway without overtopping) = 16.3% 1

"Test flood" outflow discharge = 1444 C.F.S.
which flows over the dam

= 83.7 % of "Test flood" 2

1 + 2 = 100%

"Rule of Thumb Guidance for Estimating
Downstream Dam Failure Hydrograph"

BASIC DATA

Name of dam Williams Pond Dam Name of town Lebanon, Connecticut
Drainage area = 3.12 sq.mi. Top of dam 447 - 446.8 NGVD
Spillway type = Broad crest overflow Crest of spillway 445 NGVD
Surface area at crest elevation = 263 acres
Reservoir bottom near dam = 425 NGVD
Assumed side slopes of embankments = 2:1
Depth of reservoir at dam site 20 ft. = yo = 20 ft.
Mid-height elevation of dam = 435 NGVD
Length of dam at crest = 280 feet
Length of dam at mid-height = 97.0 feet
40% of dam length at mid-height = Wb = 38.8 feet

Step 1:

Elevation NGVD	Reservoir Estimated Storage In AC-ft.	Remarks
445.0	3520	
446.0	3783	
447.0	4046	
448.0	4309	
449.0	4572	
450.0	4835	

Step 2:

$$Q_{pl} = \frac{8}{27} w_b \sqrt{g} y_o^{3/2}$$
$$= \underline{1.68} \quad w_b y^{3/2} = 5830 \text{ CFS}$$

Note: Failure of dam is assumed to be instantaneous when pool reaches top of dam.

DAM FAILURE ANALYSIS

WILLIAMS POND DAM

- | | | |
|---|---|----------|
| 1. Failure discharge with pool at top of dam | = | 5830 CFS |
| 2. Depth of water in reservoir at time of failure | = | 20 ft. |
| 3. Maximum depth of flow downstream of dam at
time of failure | = | 13 ft. |
| 4. Water surface elevation just downstream of dam
at time of failure | = | 438 NGVD |

Brewster Pond is located 2,000 ft. downstream of William's Pond Dam. Valley storage between these two ponds is not significant in reducing the discharge. There is a 39 foot drop into Brewster Pond which will cause the dissipation of wave and kinetic energy of the failure discharge. Consequently, it is estimated that the water surface elevation between William's Pond and Brewster Pond will vary from 438 NGVD to 412 NGVD. The increase of depth in Brewster Pond due to failure of Moodus Dam is approximately 4 ft. \pm . The discharge below Brewster Pond will flow obeying Manning's formula as a uniform flow. The flow will have the following hydraulic characteristics:

$$Q = 5830 \text{ CFS}$$

$$s = 0.0038\pm$$

$$n = 0.05$$

$$b = 40 \text{ ft.}$$

$$d = 7 \text{ ft.}$$

$$\text{Side slopes} = 2H \text{ to } 1V$$

It is also estimated that there will be a depth of 9 ft. of water over Rt. 207 just downstream of the dam.

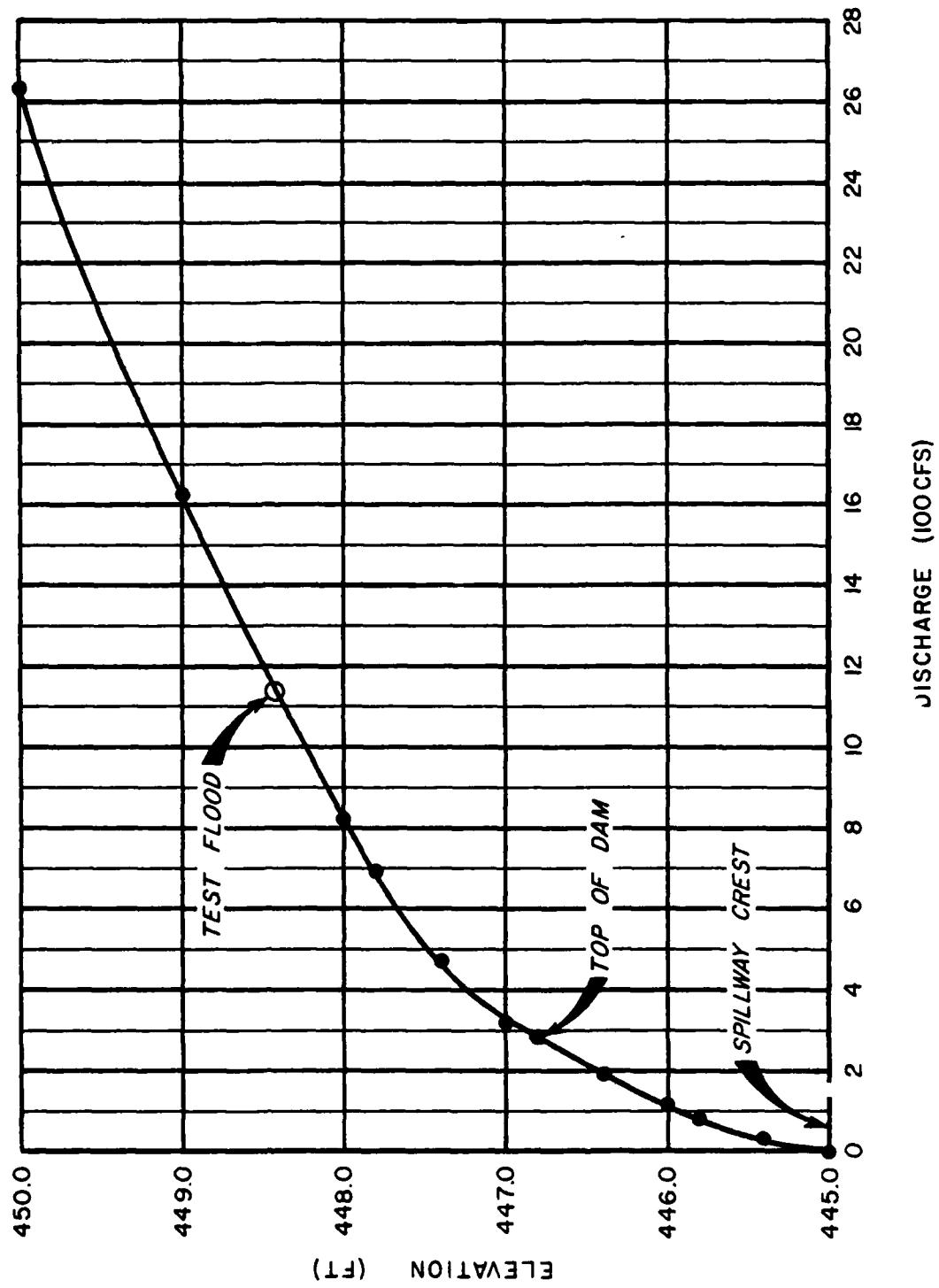
Spillway Rating Curve Computations
Williams Pond Dam

Spillway Width = 39 ft.;
Length of Dam = 280 ft.;
C = 3.0

Spillway Crest = 445.0 NGVD
Top of Dam = 446.8 NGVD

Elevation (ft.) NGVD	Discharge (CFS)	Remarks
445.0	0	Spillway Crest
445.4	30	
445.8	84	
446.0	117	
446.4	194	
446.8	282	Top of Dam
447.0	319	
447.4	473	
447.8	693	
448.0	822	
449.0	1623	
450.0	2635	

<u>Frequency and Discharge (CFS)</u>	<u>Elevation (Ft.) NGVD</u>
$Q_{10} = 314$	446.98
$Q_{50} = 354$	447.11
$Q_{100} = 368$	447.15
Test Flood (1/2 PMF) = 1138	448.43



SPILLWAY RATING CURVE
WILLIAMS POND DAM

APPENDIX E
INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE NUMBER	IDENTITY DIVISION	CITY, COUNTY, STATE, COUNTY, STATE, COUNTY, DATE	NAME	REPORT DATE			
				DAY	MONTH	YEAR	
C1	551 NED	CJ 01102	WILLIAMS POND DAM	4137.6	7210.1	OCTOBER 19	
(1) POPULAR NAME				(2) NAME OF IMPOUNDMENT			
LAKE WILLIAMS DAM				WILLIAMS POND			
(3) REGION BASIN				(4) NEAREST DOWNSTREAM CITY - TOWN - VILLAGE			
RIVER OR STREAM				DIST FROM DAM (MI.)			
01 07 HARILEY BROOK				1			
(5) GILMAN				(6) POPULAR CAPACITIES			
TYPE OF DAM				YEAR COMPLETED	PURPOSES	STORAGE CAPACITY	HYDRO. CAPACITY
GRANITE				1865	R	27	27
(7) REMARKS				(8) NAVIGATION LOC'S			
OWNER				POWER CAPACITY			
GILMAN BROTHERS CO				UNKNOW	INSTALLED	PROPOSED	NO.
(9) CONSTRUCTION				(10) ENGINEERING BY			
DESIGN				CONSTRUCTION			
NONE				NONE			
(11) INSPECTION BY				(12) INSPECTION DATE			
C.E. MAGUIRE, INC.				26 JUN 78	DAY	MO	YEAR
(13) REMARKS				(14) AUTHORITY FOR INSPECTION			
PL. 92-367							

END

FILMED

DTIC